

APPLICATION FOR A CERTIFICATE OF SITE COMPATIBILITY

Submitted to:

NORTH DAKOTA PUBLIC SERVICE COMMISSION

Submitted by:

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LOGAN AND MCINTOSH COUNTIES, NORTH DAKOTA

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TABLE OF CONTENTS

1. Introduction	1
1.1. Compliance with the Energy Conversion and Transmission Facility Siting Act, North Dakota Century Code Chapter 49-22	2
1.2. Project Summary	6
1.2.1. Study Area.....	6
1.2.2. Project Area	7
1.2.3. Project Layout.....	7
1.2.4. Selection of Project Area	7
1.2.5. Project Development History	8
1.2.6. Project Area Wind Characteristics.....	9
1.2.7. Projected Output	9
1.2.8. Project Schedule	10
1.2.9. Expansion or Addition.....	10
1.2.10. Project Ownership	10
1.2.11. Project Cost.....	10
2. Need for Facility	11
2.1. Need Analysis.....	11
2.2. Alternatives.....	12
2.3. Ten-Year Plan	12
3. Site Selection Criteria.....	13
3.1. Exclusion Areas	13
3.2. Avoidance Areas	15
3.3. Selection Criteria.....	17
3.4. Policy Criteria	20
3.5. Design and Construction Limitations.....	22
3.6. Economic Considerations	23
4. Description of the Proposed Facility.....	24
4.1. Project Components	24
4.1.1. Wind Turbines.....	24

4.2. Project Layout	28
4.3. Estimated Project Facility Impacts.....	30
5. Project Construction, Operation, and Decommissioning	32
5.1. Project Construction	32
5.1.1. Construction Activities.....	32
5.1.2. Construction Management.....	33
5.2. Commissioning.....	34
5.3. Project Operation and Maintenance	34
5.3.1. Supervisory Control and Data Acquisition System	34
5.3.2. Light-Mitigating Technology	34
5.3.3. Maintenance Schedule	34
5.4. Decommissioning and Restoration.....	35
6. Environmental Analysis	36
6.1. Demographics	36
6.1.1. Existing Conditions.....	36
6.1.2. Demographic Impacts and Avoidance/Minimization Measures	37
6.2. Land Cover, Land Use, and Zoning.....	38
6.2.1. Existing Conditions.....	38
6.2.2. Land Cover, Land Use, and Zoning Impacts and Avoidance/Minimization	42
6.3. Public Services	44
6.3.1. Existing Conditions.....	44
6.3.2. Public Services Impacts and Avoidance/Minimization Measures	46
6.4. Human Health and Safety.....	49
6.4.1. Existing Conditions.....	50
6.4.2. Human Health and Safety Impacts and Avoidance/Minimization Measures	52
6.5. Sound Resources.....	55
6.5.1. Existing Conditions.....	55
6.5.2. Sound Impacts and Avoidance/Minimization	55
6.6. Visual Resources	56
6.6.1. Existing Conditions.....	56
6.6.2. Visual and Aesthetic Impacts and Avoidance/Minimization Measures	57

6.7. Cultural and Archaeological Resources	58
6.7.1. Existing Conditions.....	59
6.7.2. Cultural Resources Impacts and Avoidance/Minimization Measures.....	60
6.8. Recreational Resources	60
6.8.1. Existing Conditions.....	61
6.8.2. Recreational Resources Impacts and Avoidance/Minimization Measures	61
6.9. Effects on Land-Based Economies	61
6.9.1. Existing Conditions.....	61
6.9.2. Land Based Economies Impacts and Avoidance/Minimization Measures	62
6.10. Soil Resources	63
6.10.1. Existing Conditions.....	63
6.10.2. Soil Resources Impacts and Avoidance/Minimization Measures.....	64
6.11. Geologic and Groundwater Resources	65
6.11.1. Existing Conditions.....	65
6.11.2. Geologic and Groundwater Impacts and Avoidance/Minimization Measures	66
6.12. Surface Water and Floodplain Resources.....	67
6.12.1. Existing Conditions.....	67
6.12.2. Surface Water and Floodplain Resources Impacts and Avoidance / Minimization Measures	67
6.13. Wetlands and Waterways.....	68
6.13.1. Existing Conditions.....	68
6.13.2. Wetlands Impacts and Avoidance/Minimization Measures	69
6.14. Vegetation Resources	70
6.14.1. Existing Conditions.....	70
6.14.2. Vegetation Resources Impacts and Avoidance/Minimization Measures.....	71
6.15. Wildlife.....	72
6.15.1. Existing Conditions.....	73
6.15.2. Wildlife Impacts and Avoidance/Minimization Measures	78
6.16. Rare and Unique Natural Resources.....	84
6.16.1. Existing Conditions.....	84
6.16.2. Rare and Unique Natural Resource Impacts and Mitigation Measures	88

6.17. Summary of Impacts and Avoidance/Minimization Measures	91
7. Identification of Potential Permits/Approvals	100
8. Factors Considered	105
8.1. Public Health, Welfare, Natural Resources, and the Environment	105
8.2. Minimizing Adverse Environmental Effects.....	105
8.3. Potential for Beneficial Uses of Waste Energy	105
8.4. Unavoidable Adverse Environmental Effects	105
8.5. Alternatives to the Proposed Site.....	105
8.6. Irreversible and Irretrievable Commitments of Natural Resources	106
8.7. Direct and Indirect Economic Impacts.....	106
8.8. Existing Development Plans of the State, Local Government, and Private Entities at or in the Vicinity of the Site	106
8.9. Effect of Site on Cultural Resources	106
8.10. Effect of Site on Biological Resources.....	107
9. Agency Comments	108
9.1. U.S. Army Corps of Engineers, North Dakota Regulatory Office	108
9.2. U.S. Department of Commerce, National Telecommunications and Information Administration	108
9.3. U.S. Bureau of Land Management.....	108
9.4. U.S. Department of Agriculture, Natural Resources Conservation Service	108
9.5. Department of Defense	108
9.6. Wildlife Agencies (U.S. Fish and Wildlife Service, North Dakota Field Office, and North Dakota Game and Fish)	109
9.6.1. 28 January 2020 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting	109
9.6.2. 3 April 2020 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting	109
9.6.3. 22 April 2020 U.S. Fish and Wildlife Service Communication	110
9.6.4. 30 October 2020 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting	110
9.6.5. 8 December 2020 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting	110

9.6.6. 5 January 2021 North Dakota Game and Fish Consultation Letter	110
9.6.7. 15 January 2021 North Dakota Game and Fish Call	110
9.6.8. 29 January 2021 U.S. Fish and Wildlife Service Letter.....	111
9.6.9. 9 August 2021 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting	111
9.6.10. 20 September 2021 North Dakota Game and Fish and U.S. Fish and Wildlife Service meeting	111
9.6.11. 8 December 2021 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting	111
9.6.12. 6 January 2022 U.S. Fish and Wildlife Service Meeting.....	112
9.6.13. 10 February 2022 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting	112
9.7. North Dakota Aeronautics Commission and Wishek Municipal Airport	112
9.8. North Dakota Department of Environmental Quality	113
9.9. North Dakota Department of Trust Lands	113
9.10. North Dakota Department of Water Resources (formerly the State Water Commission)	113
9.11. North Dakota Geological Survey.....	113
9.12. North Dakota Parks and Recreation	114
9.13. North Dakota State Historic Preservation Office, State Historical Society of North Dakota.....	114
9.14. Logan County	114
9.15. McIntosh County	115
9.16. Community Outreach	115
10. Qualifications of Contributors to Siting Study.....	116
11. References	123

TABLES

Table 1-1: Certificate Completion Checklist	2
Table 1-2: Study Area Location	6
Table 1-3: Project Area Location.....	7
Table 3-1: Summary of Exclusion Areas.....	13
Table 3-2: Summary of Avoidance Areas.....	15
Table 3-3: Summary of Project Selection Criteria.....	17
Table 3-4: Summary of Policy Criteria	20
Table 4-1: Wind Turbine Characteristics.....	25
Table 4-2: North Dakota Public Service Commission and County Setback Requirements.....	28
Table 4-3: Summary of Temporary and Permanent Footprints from Project Facilities (acres) ¹	30
Table 6-1: Demographics in the Project Area	36
Table 6-2: Land Cover Types and their Relative Abundance in the Project Area	39
Table 6-3: Land Ownership in the Study Area and Project Area	39
Table 6-4: Project Summary of Land Cover Impacts.....	42
Table 6-5: U.S. Environmental Protection Agency Facility Registry Service Interests in the Study Area and Project Area	51
Table 6-6: Farmland Classifications within the Study Area and Project Area	64
Table 6-7: Summary of Permanent Impacts to Prime Farmland	65
Table 6-8: Summary of Wildlife Studies for the Badger Wind Project	72
Table 6-9: Summary of Impacts	92
Table 7-1: Potential Permits and Approvals	101
Table 10-1: Qualifications of Contributors to Siting Study	116

FIGURES

- Figure 1: Project Location
- Figure 2: Project Facilities
- Figure 3: Exclusion Areas
- Figure 4: Avoidance Areas
- Figure 5: Project Setbacks
- Figure 6: Land Cover and Use
- Figure 7: Existing Public Lands and Easements
- Figure 8: Existing Infrastructure
- Figure 9: Prime and Unique Farmland
- Figure 10: Geologic and Groundwater Resources
- Figure 11: Surface Water and Wetlands
- Figure 12: Badger Wind Project (Newspaper Map)

APPENDICES

- Appendix A: Badger Wind, LLC / Ørsted Policy Statement
- Appendix B: Badger Wind, LLC's, Ten-Year Plan
- Appendix C: Telecommunications Studies
- Appendix D: Agency Correspondence
- Appendix E: Sound Analysis Report
- Appendix F: Shadow Flicker Analysis Report
- Appendix G: Soil Types for the Badger Wind Project
- Appendix H: Bird and Bat Conservation Strategy
- Appendix I: Badger Wind Reclamation and Weed Management Plan
- Appendix J: Badger Wind Sound Waivers

ACRONYM LIST

ADLS	Aircraft Detection Lighting System
AGL	above ground level
Am	amplitude modulation
ANSI	American National Standards Institute
APE	area of potential effects
Application	Application for a Certificate of Site Compatibility
Badger Wind	Badger Wind, LLC
BBCS	Bird and Bat Conservation Strategy
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	best management practices
BOP	Balance of Plant
C&I	Commercial and industrial
Certificate	Certificate of Site Compatibility
CFR	Code of Federal Regulations
Commission	North Dakota Public Service Commission
CR Project Area	cultural resources Project Area
CRP	Conservation Reserve Program
CWA, Act	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DoD	Department of Defense
EMF	electromagnetic field

EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EVT	Existing Vegetation Type
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FM	frequency modulation
FRS	Facility Registry Service
FSA	Farm Service Agency
GE	General Electric
GW	gigawatts
ICBM	intercontinental ballistic missile
IPaC	Information for Planning and Consultation
kHz	kilohertz
km	kilometer
kV	kilovolt
kW	kilowatt
LIDAR	Light Detection and Ranging
LNTE	low-noise trailing edge
LUST	Leaking Underground Storage Tank
m	meter
MBTA	Migratory Bird Treaty Act
MDU	Montana-Dakota Utilities
MET towers	meteorological evaluation towers
MISO	Midcontinent Independent System Operator
MPC	Minnkota Power Cooperative

m/s	meters per second
MW	megawatts
ND	North Dakota
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDDEQ	North Dakota Department of Environmental Quality
NDDOT	North Dakota Department of Transportation
NDDTL	North Dakota Department of Trust Lands
ND DWR	North Dakota Department of Water Resource
NDGF	North Dakota Game and Fish
NDPDES	North Dakota Pollutant Discharge Elimination System
NDPR	North Dakota Parks and Recreation
NIEHS	National Institute of Environmental Health Sciences
NLEB	northern long-eared bats
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTIA	U.S. Department of Commerce, National Telecommunications, and Information Administration
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O&M	operations and maintenance
Ørsted	Ørsted Onshore North America, LLC
PCMM	Post-Construction Mortality Monitoring
PLOTS	Private Land Open to Sportsmen
PPA	power purchase agreement
Project	Badger Wind Project
Project Area	the 31,514-acre area of the Badger Wind Project

Q1, Q2, Q3, Q4	first, second, third, or fourth quarter of the year, respectively
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental condition
ROW	right-of-way
RSZ	rotor-swept zone
SCADA	Supervisory Control and Data Acquisition
SCP	species of conservation priority
SHPO	State Historic Preservation Office
SHSND	State Historical Society of North Dakota
Siting Act	North Dakota Century Code Chapter 49-22
Siting Rules	North Dakota Administrative Code Article 69-06-08
SPCC	Spill Prevention, Control, and Countermeasure
SPP	Southwest Power Pool
Study Area	initial area assessed for project suitability, approximately 125,954 acres
SWPPP	Stormwater Pollution Prevention Plan
TV	television
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USDOE	U.S. Department of Energy
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VFR	Visual Flight Rules
WEG	Wind Energy Guidelines
WMA	Wildlife Management Area
WNS	white-nose syndrome

WOTUS	waters of the United States
WPA	Waterfowl Production Area

1. INTRODUCTION

Badger Wind, LLC, (Badger Wind) is submitting this Application (Application) for a Certificate of Site Compatibility (Certificate) to the North Dakota Public Service Commission (Commission) for the proposed Badger Wind Project (Project) in Logan County and McIntosh County, North Dakota.

Pursuant to the North Dakota Energy Conversion and Transmission Facility Siting Act, North Dakota Century Code (NDCC) Chapter 49-22 (Siting Act), the Project is designed to further the state policy of siting energy conversion projects and associated transmission facilities in an orderly manner compatible with environmental preservation and the efficient use of resources. In accordance with this policy, the Project has been sited and designed to minimize adverse human and environmental impacts.

The Project is in Logan and McIntosh Counties, in south-central North Dakota, adjacent to the western side of the City of Wishek (refer to **Figure 1: Project Location**). A Study Area of approximately 125,954 acres was studied, analyzed, and refined to create a 31,514-acre Project Area that allows for avoidance, or minimized impacts, to natural and human resources. The Project Area provides sufficient area for construction of all project infrastructure and integrates all required setbacks and buffering of sensitive features and resources. Project infrastructure includes up to 74 wind turbines, access roads, a collector substation, electrical collection and communication systems, a transmission line, up to three permanent meteorological evaluation towers (MET towers), an Aircraft Detection Lighting System (ADLS), and an operations and maintenance (O&M) facility.

The Project would have a nameplate capacity of up to 251.6 megawatts (MW), with up to 250 MW delivered to the grid. This would be accomplished by construction and operation of up to 74 wind turbines, described in detail in **Section 1.2.3**, below.

Badger Wind is in the process of identifying an offtaker for the Project's output. Potential offtakers include utilities and commercial or industrial customers seeking a physical or virtual power purchase agreement (PPA). Alternatively, the Project may run "merchant," selling its power directly into the Midcontinent Independent System Operator (MISO) market, or the Project may be sold to a utility that would use the power to directly supply its customer base.

Badger Wind is a wholly owned subsidiary of Ørsted Onshore North America, LLC (Ørsted). Ørsted is an independent renewable energy company based in Chicago, Illinois. Ørsted is one of the largest players in the North American onshore renewable energy market and has publicly announced plans to own and operate 17.5 gigawatts (GW) of onshore renewable energy capacity by 2030. Operating assets currently under Ørsted's ownership represent 3 GW, and a further 1.5 GW of projects to be owned and operated by Ørsted are currently under construction. Ørsted's development pipeline is rapidly expanding across all North American markets to meet its 2030 target.

1.1. Compliance with the Energy Conversion and Transmission Facility Siting Act, North Dakota Century Code Chapter 49-22

The Siting Act requires the proponent of a wind energy conversion facility exceeding 0.5 MW to obtain a Certificate from the Commission in order to locate, construct, and operate the facility in the state of North Dakota. An application for a Certificate must meet certain criteria set forth in the Siting Act, as well as in North Dakota Administrative Code (NDAC) Article 69-06-08 (Siting Rules). The siting of an energy conversion facility is to be made in an orderly manner compatible with environmental preservation and the efficient use of resources (NDCC Section 49-22-02).

As part of the Project, Badger Wind intends to construct a 230-kilovolt (kV) transmission line that will be less than one mile in length (approximately 0.75 miles) to facilitate the Project's interconnection (refer to **Figure 2: Project Facilities**). The proposed transmission line would extend from the project substation and interconnect to the Wishek Junction 230-kV substation owned and operated by Montana-Dakota Utilities Company (MDU), located approximately 1.2 miles west of Wishek, in Township 132 North, Range 71 West, Section 8. Per NDCC Section 49-22-03-6(b), the proposed transmission line is not considered an "electric transmission facility" because it is less than one mile in length. Therefore, the transmission line does not fall within the Commission's siting jurisdiction and is not described or analyzed in this Application.

In this Application, Badger Wind presents the information required by the Siting Act and the Commission's Siting Rules. Badger Wind has considered the exclusion and avoidance areas, the selection criteria, and the policy criteria in the design of the Project, in accordance with NDCC Chapter 49-22 and NDAC Section 69-06-08-01, and information regarding project design, wind resources, and technical information has been included in this Application to allow a thorough understanding of the Project and to aid in review by the Commission, regulatory agencies, and the public. **Table 1-1** provides a summary of information included in this Application and the section of the document in which each siting requirement is addressed.

Table 1-1: Certificate Completion Checklist

State Authority	Description	Section
NDAC Section 69-06-04-01 Certificate of Site Compatibility		
Subsection	Contents	
a. (1)	A description of the type of energy conversion facility proposed.	1.0, 4.1
a. (2)	A description of the gross design capacity.	1.2
a. (3)	A description of the net design capacity.	1.2.7
a. (4)	A description of the estimated thermal efficiency of the energy conversion process and the assumptions upon which the estimate is based.	N/A
a. (5)	A description of the number of acres that the proposed facility will occupy.	1.0, 1.2.2

State Authority	Description	Section
a. (6) a	A description of the anticipated time schedule for obtaining the certificate of site compatibility.	1.2.8
a. (6) b	A description of the anticipated time schedule for completing land acquisition.	1.2.8
a. (6) c	A description of the anticipated time schedule for starting construction.	1.2.8
a. (6) d	A description of the anticipated time schedule for completing construction.	1.2.8
a. (6) e	A description of the anticipated time schedule for testing operations.	1.2.8
a. (6) f	A description of the anticipated time schedule for commencing commercial production.	1.2.8
a. (6) g	A description of the anticipated time schedule for beginning any expansions or additions.	1.2.9
b.	Copies of any evaluative studies or assessments of the environmental impact of the proposed facility submitted to any federal, regional, state, or local agency.	Appendix C, E, F, G, H, I, J
c.	An analysis of the need for the proposed facility based on present and projected demand for the product or products to be produced by the proposed facility, including the most recent system studies supporting the analysis of the need.	2.1
d.	A description of any feasible alternative methods of serving the need.	2.2
e.	A study area that includes the proposed facility site, of sufficient size to enable the Commission to evaluate the factors addressed in NDCC Section 49-22-09.	1.2.1, 6.0–6.17, 8.0–8.10
f.	A discussion of the utility’s policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives.	Appendix A
g.	A map identifying the criteria that provide the basis for the specific location of the proposed facility within the Study Area.	Figure 2: Project Facilities
h.	A discussion of the criteria evaluated within the Study Area, including exclusion areas, avoidance areas, selection criteria, policy criteria, design and construction limitations, and economic considerations.	3.0–3.6
i.	A discussion of the mitigative measures that the applicant will take to minimize adverse impacts that result from the location, construction, and operation of the proposed facility.	6.1.2, 6.2.2, 6.3.2, 6.4.2, 6.5.2, 6.6.2, 6.7.2, 6.8.2, 6.9.2, 6.10.2, 6.11.2, 6.12.2, 6.13.2, 6.14.2, 6.15.2, 6.16.2, 6.17

State Authority	Description	Section
j.	The qualifications of each person involved in the facility site location study.	10.0
k.	A map of the study area showing the location of the proposed facility and the criteria evaluated.	Figure 5: Project Setbacks
l.	An 8.5-inch-by-11-inch black-and-white map suitable for newspaper publication depicting the study area.	Figure 12: Newspaper Map
m.	A discussion of present and future natural resource development in the area.	6.2, 6.8, 6.10–6.16
n.	Map and GIS requirements. The applicant shall provide information that is complete, current, presented clearly and concisely, and supported by appropriate references to technical and other written material available to the Commission. The information must provide the location of the proposed facilities, the proposed site, and the criteria evaluated.	Figures 1–12, USB submittal
NDCC Section 49-22-08 Description of Application Requirements		
Subsection 1:	An application for a Certificate shall be in such form as the Commission may prescribe, containing the following information:	
a.	A description of the size and type of facility.	1.0, 4.0
b.	A summary of any studies that have been made of the environmental impact of the facility.	1.2.3, 1.2.4, 6.0–6.17, Appendix C, E, F, G, H, I, J
c.	A statement explaining the need for the facility.	2.1
d.	An identification of the location of the preferred site for any energy conversion facility.	1.2, Figure 1: Project Location
e.	An identification of the location of the preferred corridor for any transmission facility.	N/A
f.	A description of the merits and detriments of any location identified and a comprehensive analysis with supporting data showing the reasons why the preferred location is best suited for the facility.	1.1, 1.2, 2.0–3.6, 6.0–6.17, 8.0–8.10
g.	A description of mitigative measures that will be taken to minimize all foreseen adverse impacts resulting from the location, construction, and operation of the proposed facility.	6.1.2, 6.2.2, 6.3.2, 6.4.2, 6.5.2, 6.6.2, 6.7.2, 6.8.2, 6.9.2, 6.10.2, 6.11.2, 6.12.2, 6.13.2, 6.14.2, 6.15.2, 6.16.2, 6.17
h.	An evaluation of the proposed site or corridor with regard to the applicable considerations set out in NDCC Section 49-22-09 and the criteria established pursuant to NDCC Section 49-22-05.1.	1.1, 3.0–3.6, 6.0–6.17, 8.0–8.10

State Authority	Description	Section
i.	Such other information as the applicant may consider relevant or the Commission may require.	Complete Application including Appendices and Figures
NDCC Section 49-22-09(1) Factors to be considered in evaluated applications and designation of sites, corridors, and routes		
a.	Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.	6.0–6.17, 8.1
b.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	8.2
c.	The potential for beneficial uses of waste energy from a proposed energy conversion facility.	8.3
d.	Adverse direct and indirect environmental effects that cannot be avoided should the proposed site or route be designated.	8.4
e.	Alternatives to the proposed site, corridor, or route that are developed during the hearing process and that minimize adverse effects.	8.5
f.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.	8.6
g.	The direct and indirect economic impacts of the proposed facility.	8.7
h.	Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.	6.2, 6.9, 8.8
i.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	3.1, 3.2, 6.6, 6.7, 8.9
j.	The effect of the proposed site or route on areas that are unique because of biological wealth or because they are habitats for rare and endangered species.	6.16, 8.10
k.	Problems raised by federal agencies, other state agencies, and local entities.	9.0

1.2. Project Summary

The Project will be located in Logan and McIntosh Counties, in south-central North Dakota (see **Figure 1: Project Location**). The Project's nameplate capacity is up to 251.6 MW of wind energy capacity. Badger Wind is proposing to use a General Electric (GE) turbine with an output of 3.4 MW. Permanent project facilities will include:

- up to 74 wind turbines and related equipment (79 potential turbine locations are shown in **Figure 2: Project Facilities**, which includes alternate turbine locations)
- new gravel access roads and improvements to existing roads, as necessary
- a collector substation
- buried electrical collection lines and communication lines, with aboveground junction boxes and/or underground splices
- up to three permanent MET towers (five potential permanent MET tower locations are shown in **Figure 2: Project Facilities**)
- an ADLS
- an O&M facility.

The Project will interconnect via an approximately 0.75-mile transmission line extending from the project substation to the Wishek Junction 230-kV substation owned and operated by MDU.

1.2.1. Study Area

The approximately 125,954-acre Study Area (approximately 197 square miles) comprises 230 sections of primarily agricultural and livestock rangeland in Logan and McIntosh Counties (see **Figure 1: Project Location**). **Table 1-2** summarizes the townships, sections, and ranges included in the Study Area.

Table 1-2: Study Area Location

Township Name	County	Township	Range	Section(s)
Unorganized Territory	McIntosh	130N	71W	2–6
Unorganized Territory	McIntosh	130N	72W	1–6
Unorganized Territory	McIntosh	131N	71W	2–36
Unorganized Territory	McIntosh	131N	72W	1–5, 7, 9–36
Unorganized Territory	McIntosh	131N	73W	13–14, 23–26, 35–36
Unorganized Territory	McIntosh	132N	70W	4–8
Unorganized Territory	McIntosh	132N	71W	1, 4–9, 12, 16–22, 26–35
Unorganized Territory	McIntosh	132N	72W	1–3, 10–15, 22–29, 32–36
Unorganized Territory	Logan	133N	70W	6–9, 15–22, 27–34
Unorganized Territory	Logan	133N	71W	1–36
Unorganized Territory	Logan	133N	72W	1–5, 8–12, 15–22, 24–25, 36

Township Name	County	Township	Range	Section(s)
Red Lake	Logan	134N	71W	29–33
Starkey	Logan	134N	72W	25–29, 32–36

1.2.2. Project Area

The approximately 31,514-acre Project Area (approximately 49 square miles) comprises 69 sections of primarily agricultural and livestock rangeland in Logan and McIntosh Counties (see **Figure 1: Project Location**). **Table 1-3** summarizes the townships, sections, and ranges included in the Project Area.

Table 1-3: Project Area Location

Township Name	County	Township	Range	Section(s)
Unorganized Territory	McIntosh	132N	70W	5–7
Unorganized Territory	McIntosh	132N	71W	1, 4–8, 12, 17–21, 28–30
Unorganized Territory	McIntosh	132N	72W	1, 2, 12–14, 23
Unorganized Territory	Logan	133N	70W	6–8, 16–21, 28–33
Unorganized Territory	Logan	133N	71W	3–6, 8–10, 12, 14, 15, 18–23, 25–29, 31–36
Unorganized Territory	Logan	133N	72W	36
Red Lake	Logan	134N	71W	31–32

1.2.3. Project Layout

In this Application, Badger Wind provides the preliminary project layout, which includes all components described above. The project layout comprises 79 proposed turbine locations; this includes up to 74 locations that would be built, as illustrated in **Figure 2: Project Facilities**.

The project layout satisfies all North Dakota siting requirements, per the Siting Act and Siting Rules, while optimizing efficiency of space and electrical generation as well as avoiding or minimizing impacts to the environment, cultural resources, and local and state economies. Badger Wind has sited turbines and associated facilities in compliance with Commission and Logan County setback requirements. Once the Project is constructed, Badger Wind will file as-built drawings with the Commission and Logan and McIntosh Counties.

1.2.4. Selection of Project Area

The renewable energy produced by the proposed Project will be positioned to help meet regional and/or national demand for renewable energy, or commercial and industrial (C&I) customer demand. The Project Area was selected due to its excellent wind resource (refer to **Section 1.2.5**), proximity to an accessible point of interconnection to the electrical grid, strong landowner support, and compatibility with existing land uses and environmental features.

1.2.5. Project Development History

Badger Wind began evaluating the Study Area as a potentially suitable site for a wind project in early 2017. Over the course of the following five years, Badger Wind refined the Project Area as a result of numerous environmental studies and in consultation with environmental agencies and other stakeholders.

1.2.5.1. 2017

In early 2017, Badger Wind identified the Study Area, which comprises approximately 125,954 acres, as a potentially suitable site for a wind project. The Study Area was selected based on desktop analysis showing a likely low environmental impact, high wind resource, ample electrical transmission capacity, and suitable agricultural land for wind development. Badger Wind began its land control efforts in 2017 by engaging in community outreach as well as assigning land for placement of a temporary MET tower. This allowed Badger Wind to collect robust and accurate wind data over the course of four years.

1.2.5.2. 2018

Beginning in 2018, Badger Wind initiated a series of environmental studies as part of its site selection process. Throughout the year, Badger Wind engaged in land leasing efforts. In April and October, Badger Wind hosted public dinners in Wishek to introduce the wind Project to the community and provide interested landowners the opportunity to participate.

1.2.5.3. 2019

In spring of 2019, Badger Wind continued with its environmental studies. These included pre-construction avian use surveys, eagle and raptor nest surveys, acoustic monitoring for bats, and grouse lek monitoring. Badger Wind initiated coordination with Logan County in January 2019.

1.2.5.4. 2020

Initial agency coordination with North Dakota Game and Fish (NDGF) and U.S. Fish and Wildlife Service (USFWS) was also started in early 2020. Badger Wind completed a second year of avian use studies, eagle and raptor nest surveys, bat acoustic monitoring, and grouse lek monitoring in 2020. Additionally, grassland and bat habitat assessments took place in 2020. All these studies helped Badger Wind refine the Project Area to help avoid and minimize impacts to wildlife, wetlands, and sensitive habitats. Badger Wind initiated coordination with McIntosh County in January 2020.

1.2.5.5. 2021

In 2021, Badger Wind performed additional habitat assessments of grasslands and special status species. Micro-siting efforts took place on site in May, July, and October of 2021. In spring of 2021, Badger Wind met with Logan and McIntosh Commissioners to provide an overview of the Project and discuss requirements and expectations for the Project. In consultation with NDGF and USFWS, Badger Wind iteratively refined its layout to avoid unbroken grassland and minimize

impacts. In October 2021, Badger Wind hosted a community open house and landowner dinner; feedback on the proposed Project obtained from landowners during the event was overwhelmingly positive. Badger Wind has also been meeting with the Wishek Municipal Airport about the project. Coordination with the local airport has been positive and they have been accommodating towards the development of the project.

1.2.5.6. 2022

In 2022, Badger Wind continued working closely with participating landowners, the surrounding community, wildlife agencies, the interconnecting utility, potential project contractors, and other stakeholders to refine the proposed layout and further refine the Project Area. The Project Area Badger Wind is submitting as part of this Application includes participating and pending participating parcels. It excludes from its boundary all non-participating parcels.

1.2.6. Project Area Wind Characteristics

The U.S. Department of Energy (USDOE) and the North Dakota Division of Community Services have conducted wind resource assessment studies in North Dakota. According to the USDOE, annual average wind speeds of 6.5 meters per second (m/s) and above are suitable for wind power projects. The October 2010 USDOE wind map for the state of North Dakota indicates that the wind resources within the Project Area average 8.5 to 9.0 m/s at a height of 80 meters above the ground (NREL 2010).

Six temporary MET towers are currently located on site. Compilation and assessment of wind resource data has been ongoing since January 2017 when the first temporary MET tower was installed. The MET towers have collected data showing that long-term annual wind speeds across the site are at or above the upper end of the average range for North Dakota, indicating that the Project Area is an excellent resource for electrical generation.

To augment MET tower data, Badger Wind deployed a temporary trailer-mounted Light Detection and Ranging (LIDAR) unit. LIDAR measures wind speed and direction by emitting a laser light pulse and measuring the frequency shift of the reflected light wave. LIDAR units provide data up to and beyond hub height of the proposed turbines and help to supplement wind data collected from MET towers.

As discussed further in **Section 4.1.1.10** of this Application, Badger Wind will install up to three permanent MET towers as part of the Project. Five potential locations are shown in **Figure 2: Project Facilities**, but only three permanent MET towers will be built. The final locations of the three permanent MET towers will be selected with input from the turbine manufacturer and will meet applicable siting requirements.

1.2.7. Projected Output

The Project will have a nameplate capacity of up to 251.6 MW. The Project's interconnection request will permit up to 250 MW to be delivered to the grid. The Project has a projected average output ranging from 1,000,000 to 1,200,000 MW hours per year. Variations in the actual project output will depend upon final wind turbine selection and any additional changes to the final

design and layout of the facility. As a point of reference, this amount of electrical output is enough to power approximately 70,000 average American homes.

1.2.8. Project Schedule

The following list provides details of the proposed schedule for the design, permitting, and construction of the Project:

- Land Acquisition: All participating landowner agreements have been secured with the exception of one agreement, which is anticipated to be acquired in Q2 2022.
- Certificate of Site Compatibility: Badger Wind anticipates the Certificate will be issued by the Commission in Q3 2022.
- Conditional Use Permit with Logan County: Badger Wind expects to file this permit Q1 2022. Badger Wind anticipates Logan County will issue the Conditional Use Permit in Q2 2022.
- Other Permits: Badger Wind will acquire all other permits necessary for construction of the Project prior to conducting the work for which the permit is required.
- Construction: Project construction is anticipated to begin in September 2022 and be completed by the end of October 2023.
- Commissioning: Upon completion of the construction phase, the Project will undergo detailed inspection and testing procedures before being commissioned. Inspection and testing will occur for each individual component of the wind turbines, as well as the associated communication, meteorological, collection, and Supervisory Control and Data Acquisition (SCADA) system.
- Commercial Operations: Badger Wind anticipates full commercial operation to occur by the end of Q4 2023.

1.2.9. Expansion or Addition

Badger Wind does not propose any additions or expansions to the Project at this time. Should Badger Wind develop adjacent areas in the future, all necessary permits and approvals would be obtained to allow such an expansion.

1.2.10. Project Ownership

The Project will be developed, constructed, owned, and operated by Badger Wind.

1.2.11. Project Cost

The estimated total cost to construct Badger Wind is approximately USD 390M.

2. NEED FOR FACILITY

2.1. Need Analysis

Badger Wind is in the process of identifying an off taker for the project's output. As an independent power producer, Badger Wind is able to bid in a variety of markets and contractual structures. Badger Wind is actively marketing the Project to a number of potential offtakers who would enter into ten- to 20-year physical or virtual PPAs. Another option is for the Project to run "merchant," selling its power directly into the MISO market and earning the spot Locational Marginal Price. Alternatively, the Project may be sold to a utility that would use the power to directly supply its customer base.

Utilities and other customers seeking to diversify and build their energy generation portfolios are attracted to wind energy projects because of their ability to offer long-term contracts at a fixed and competitive price while providing the associated environmental benefits to meet existing and future renewable energy procurement and sustainability goals and mandates. In North Dakota, excellent wind resources create high-capacity factor generation, reducing the cost/megawatt hour (MWh). In general, alternative energy sources provide lower costs per megawatt hour than conventional sources (Lazard 2021).

In addition to traditional utility demand for renewable energy, a growing number of corporations are turning to renewable energy to save money on energy and meet their sustainability goals (CEBA 2021). Corporate customers either purchase renewable energy directly or obtain renewable benefits and cost savings through financially settled contracts, sometimes called virtual PPAs. In addition, many utilities are creating "green tariffs," which allow customers to purchase up to 100 percent renewable energy from the utility (EPA 2018). Corporations such as Apple, Google, and Facebook, along with many others, have recently set goals to obtain 100 percent of their energy from renewables.

These clean energy goals fuel the demand for corporate renewables procurement and subsequent PPAs. According to Wood Mackenzie's report titled an *Analysis of Commercial and Industrial Wind Energy Demand in the United States*, the United States is "at the beginning stage of a corporate renewables procurement boom," with approximately "85 gigawatts of renewable energy demand" from the "largest U.S. companies" alone through 2030 (Wood Mackenzie 2019). Another Wood Mackenzie report titled *US Corporate Procurement of Wind and Solar 2020* (Wood Mackenzie 2020) lists 2019 as "the largest year for megawatts of annual wind and solar C&I capacity additions and the largest year on record for new wind and solar C&I PPAs signed." These growth trends are expected to continue, and 2020 saw an immense demand for C&I renewable energy PPAs. Similarly, according to a 2019 research report, corporate contracts accounted for 22 percent of 2018 PPAs for renewables in the United States (Foehringer-Merchant 2019a). Further, the buyers are not just large corporations; smaller companies are entering into aggregated purchasing models and further driving additional market expansion (Foehringer-Merchant 2019b).

2.2. Alternatives

According to data published in Lazard’s October 2021 Levelized Cost of Energy Analysis (Version 15.0), wind energy currently ranks among the most cost-effective sources of energy generation. In fact, in most cases, wind energy generation is considerably more cost effective than traditional generation technologies (Lazard 2021).

Due to the cost effectiveness of wind power, and the stated purpose of the Project to provide renewable energy, non-renewable energy generation sources were not considered as an alternative. In addition, other renewable energy resources would not likely be a practical alternative for the Project. As discussed in **Section 1.2.4**, the wind resource in the Project Area is ideal for wind energy generation. A ground-mounted solar facility capable of generating 251.6 MW would require large, contiguous tracts of land that would be taken out of production for the lifetime of the Project, as well as landowners willing to lease such acreage. Furthermore, as described in **Section 1.2.1**, Badger Wind has secured leasing agreements for an area large enough to support construction of a wind project exceeding 251.6 MW and is currently acquiring local permits necessary to begin construction of the Project. Other renewable energy sources, such as biomass and hydroelectric power, are not practicable in this location. There is not a reliable and sustainable fuel source in the area that would support a comparable biomass plant, nor are there sufficient hydrologic resources to support a hydroelectric plant capable of generating 251.6 MW.

2.3. Ten-Year Plan

Pursuant to NDCC Section 49-22-04 and NDAC Chapter 69-06-02, Badger Wind submitted a Ten-Year Plan for years 2022–2032 in February 2022. Badger Wind’s Ten-Year Plan, included as **Appendix B**, is consistent with the contents of this Application.

3. SITE SELECTION CRITERIA

Badger Wind selected the Project Area based on a number of factors, including the excellent wind resource, support from landowners, regional demand for renewable energy, and compatibility with existing land uses and resources. In addition, site selection for the Project was based on the criteria outlined in NDAC Chapter 69-06-08. These criteria are discussed further below.

3.1. Exclusion Areas¹

The geographical areas identified in Section 69-06-08-01(1) of the NDAC “must be excluded in the consideration of a site for an energy conversion facility.” NDAC Section 69-06-08-01(2) also lists geographical areas that “must be excluded in the consideration of a site for a wind energy conversion facility.”

Table 3-1 summarizes these Exclusion Areas and their presence or absence in the Project Area. Exclusion Areas within the Study Area and Project Area are depicted on **Figure 3: Exclusion Areas**.

Table 3-1: Summary of Exclusion Areas

General Exclusion Area	Present Within Project Area?	Description	Section Addressed
Designated or registered national: parks; memorial parks; historic sites and landmarks; natural landmarks; historic districts; monuments; wilderness areas; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands.	None	N/A	6.2, 6.6, 6.7, 6.8, 6.12
Designated or registered state: parks; forests; forest management lands; historic sites; monuments; historical markers; archaeological sites; grasslands; wild, scenic, or recreational rivers; game refuges; game management areas; management areas; and nature preserves.	None	N/A	6.2, 6.6, 6.7, 6.8, 6.12
County parks and recreational areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.	None	N/A	6.8, 6.9
Areas critical to the life stages of threatened or endangered animal or plant species.	None	N/A	6.16
Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged.	None	N/A	6.16

¹ As defined in NDAC Section 69-06-01-01(8), exclusion criteria are “criteria that remove areas from consideration for energy conversion facility sites and transmission facility routes.” Exclusion areas are characterized by one or more of these limiting criteria.

General Exclusion Area	Present Within Project Area?	Description	Section Addressed
Areas within 1,200 feet of the geographic center of an intercontinental ballistic missile (ICBM) launch or control facility.	None	No ICBMs are in Logan or McIntosh County.	4.2, 6.4
Areas within 30 feet [9.14 meters] on either side of a direct line between an ICBM launch facility and a missile alert or launch control facilities to avoid microwave interference. This restriction only applies to aboveground structures, not to surface features, such as roads, or belowground infrastructure.	None	No ICBMs are in Logan or McIntosh County.	4.2, 6.4
Additional Exclusion Areas for Wind Energy Conversion Facilities²			
1.1 times the turbine height from the nearest edge of an interstate or state roadway right-of-way (ROW).	Present	No turbines will be sited in these exclusion areas.	4.2
1.1 times the turbine height plus 75 feet from the centerline of any county or maintained township roadway.	Present	No turbines will be sited in these exclusion areas.	4.2
1.1 times the turbine height from the nearest edge of railroad ROW.	Present	No turbines will be sited in these exclusion areas.	4.2
1.1 times the turbine height from the nearest edge of a 115-kV or higher transmission line ROW	Present	No turbines will be sited in these exclusion areas.	4.2
1.1 times the turbine height from the property line of a non-participating landowner and three times the height of the turbine from an inhabited rural residence of a non-participating landowner unless a variance is granted. A variance may be granted if an authorized representative or agent of the permittee, the non-participating landowner, and affected parties with associated wind rights file a written agreement expressing all parties' support for a variance to reduce the setback requirement in this subsection. A non-participating landowner is a landowner that has not signed a wind option or an easement agreement with the permittee of the wind energy conversion facility as defined in NDCC Chapter 17-04.	Present	No turbines will be located in these exclusion areas.	4.2

¹For the purposes of setbacks, Badger Wind assumed a turbine of up to 98 meters in hub height, with an up to 140-meter rotor diameter, and/or total tip height of 168 meters.

3.2. Avoidance Areas²

Pursuant to Section 69-06-08-01(3) of the NDAC, certain geographical areas “may not be approved as a site for an energy conversion facility unless the applicant shows that under the circumstances there is no reasonable alternative. In determining whether an avoidance area should be designated for a facility the Commission may consider, among other things, the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative sites. Economic considerations alone will not justify approval of these areas. A buffer zone of a reasonable width to protect the integrity of the area must be included. Natural screening may be considered in determining the width of the buffer zone.” Additional avoidance area for wind energy conversion facilities is set forth in NDAC Section 69-06-08-01(4).

Table 3-2 summarizes avoidance areas and their applicability to the Project. Avoidance areas within the Study and Project Areas are shown on **Figure 4: Avoidance Areas**.

Table 3-2: Summary of Avoidance Areas

Avoidance Area	Present Within Project Area?	Description	Section Addressed
Historical resources which are not designated as exclusion areas.	Present	Identified eligible cultural and architectural resources will be avoided.	6.7
Areas within the city limits of a city or the boundaries of a military installation.	None	No project infrastructure will be sited within city limits or the boundaries of a military installation.	6.4, 6.4
Areas within known floodplains as defined by the geographical boundaries of the 100-year flood.	No mapped floodplain data	N/A	6.12
Areas that are geologically unstable.	None	N/A	6.11

² As defined in NDAC 69-06-01-01(2), avoidance criteria are “criteria that remove areas from consideration for energy conversion facility sites and transmission facility routes unless it is shown that under the circumstances there are no reasonable alternatives.” Avoidance areas have one or more of these limiting criteria.

Avoidance Area	Present Within Project Area?	Description	Section Addressed
Woodlands and wetlands.	Present	<p>Wetlands and small woodlands and shelterbelts are present within the Project Area. Permanent impacts to wetlands have been avoided to the extent feasible.</p> <p>As currently designed, up to approximately 13.4 acres of temporary impacts, and less than 0.01 acres of permanent impacts to wetlands could occur as a result of project construction.</p> <p>Impacts to woodlands will be avoided to the extent practicable. As currently designed, the Project may impact approximately 0.03 acres of trees/shrubs. Where unavoidable, impacts have been minimized to the extent feasible. If impacts to trees and/or shrubs occur, Badger Wind will adhere to the Commission's tree and shrub mitigation specifications.</p>	6.9, 6.13, 6.14
Areas of recreational significance that are not designated as exclusion areas.	None	N/A	6.8
Additional Avoidance Areas for Wind Energy Conversion Facilities			
A geographic area where, due to the operation of the facility, the sound levels within 100 feet of an inhabited residence or community building will exceed 45 A-weighted decibels (dBA). The sound level avoidance area criteria may be waived in writing by the owner of the occupied residence or the community building.	Present	<p>A noise study was completed for the Project using GE 3.4-MW turbines at all potential turbine locations (Appendices E and J). With the exception of 9 receptors, modeled sound levels comply with the sound level requirement. For the 9 receptors with exceedances, Badger Wind has obtained or is in the process of obtaining written waivers. In the event waivers are not obtained, Badger Wind will take steps to ensure compliance with the sound level requirement.</p>	6.5, Appendix E Appendix J

3.3. Selection Criteria³

Section 69-06-08-01(5) states that a “site may be approved in an area only when it is demonstrated to the Commission by the applicant that any significant adverse effects resulting from the location, construction, and operation of the facility in that area, as they relate to the following, will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum.” A summary of the selection criteria set forth in NDAC Section 69-06-08-01(5) is included in **Table 3-3**.

Table 3-3: Summary of Project Selection Criteria

Selection Criteria	Potential Adverse Effects from Project	Section Addressed
The Impact Upon Agriculture:		
(1) Agricultural production	Approximately 14,375 acres (about 45.6 percent) of the Project Area is identified as cultivated croplands or hay/pasture lands (refer to Table 6-2). The Project would result in permanent impacts to less than one percent of the total land cover within the Project Area.	6.2, 6.10
(2) Family farms and ranches	While some areas of agricultural production will be converted to a renewable energy generation resource during the life of the Project, the Project will provide additional income to these landowners in the form of lease income. Any economic losses are anticipated to be minor in comparison. Additionally, the Project has been designed to minimize impacts to family farms and ranches to the extent possible, and turbines have been set back from occupied dwellings in accordance with Commission requirements.	6.5, 6.9
(3) Land which the owner demonstrates has soil topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation	Landowners have not expressed concerns relating to irrigation of their lands. No known irrigation system is present within the Project Area.	NA
(4) Surface drainage patterns and ground water flow patterns	The Project is not anticipated to result in adverse impacts to surface drainage or groundwater flow patterns.	6.11, 6.12

³ As defined in NDAC 69-06-01-01 (14), selection criteria is defined as “criteria that guide and govern the selection of energy conversion facility sites and transmission facility corridors and routes in order to minimize adverse human and environmental impact after the exclusion and avoidance criteria have been applied.”

Selection Criteria	Potential Adverse Effects from Project	Section Addressed
(5) The agricultural quality of cropland	Landowners will be compensated for project facilities sited on their properties and shall be reimbursed for lost revenues due to temporary construction impacts to crops. No adverse impacts to the agricultural quality of croplands are anticipated.	6.2, 6.10
The Impact Upon the Availability and Adequacy of the Following Categories:		
(1) Law enforcement	No adverse impacts anticipated.	6.3
(2) School systems and education programs	No adverse impacts anticipated.	6.3
(3) Governmental services and facilities	No adverse impacts anticipated.	6.3
(4) General and mental health care facilities	No adverse impacts anticipated.	6.3
(5) Recreational programs and facilities	No adverse impacts anticipated.	6.3
(6) Transportation facilities and networks	A temporary increase in vehicular traffic will occur within the Project Area during construction. Badger Wind will coordinate with local road authorities regarding haul routes. During operations, road use will generally be similar to other area traffic.	6.3
(7) Retail service facilities	No adverse impacts anticipated.	6.3
(8) Utility services	No adverse impacts to utility services are expected. Badger Wind will coordinate with KEM Electric Cooperative, Inc., and the MDU Company for electricity for the O&M facility and the South-Central Regional Water District for rural water or will drill a well.	6.3
The Impact Upon:		
(1) Local institutions	No adverse impacts anticipated.	6.3
(2) Noise-sensitive land uses	Noise-sensitive land uses within the Project Area include residences in proximity to turbine sites. However, Badger Wind has sited turbines to comply with applicable setbacks, and the Project will comply with the Commission's sound level requirement. With the exception of nine receptors modeled sound levels comply with the sound level requirement for the nine receptors with exceedances, Badger Wind has obtained or is in the process of obtaining written waivers (Appendix J)	6.5 Appendix J

Selection Criteria	Potential Adverse Effects from Project	Section Addressed
(3) Light-sensitive land uses	Turbine and MET tower lighting will be in accordance with FAA minimum standards, and, subject to FAA approval, Badger Wind will use commercially reasonable efforts to install a light-mitigating technology that is consistent with applicable requirements. Lighting of ancillary structures will be downward shielded.	5.2, 6.6
(3) Rural residences and businesses	No adverse impacts anticipated. Badger Wind has sited turbines to comply with applicable setbacks, and the Project will comply with the Commission's sound level requirement. With the exception of nine receptors modeled sound levels comply with the sound level requirement for the nine receptors with exceedances, Badger Wind has obtained or is in the process of obtaining written waivers (Appendix J)	6.5, 6.6 Appendix J
(4) Aquifers	No adverse impacts anticipated. The Wishek and Lower Wishek aquifers are at depths greater than proposed construction activities.	6.11
(5) Human health and safety	No adverse impacts anticipated.	6.4
(6) Animal health and safety	No adverse impacts to domestic animal health and safety are anticipated, and measures will be implemented to ensure construction impacts to livestock are avoided. Coordination is ongoing with NDGF and USFWS regarding minimization of impacts to wildlife.	6.9, 6.15, 6.16
(7) Plant life	Temporary and permanent impacts to vegetation will occur as a result of project development. Following construction, temporarily disturbed non-agricultural lands will be revegetated using a seed mix approved by the Natural Resources Conservation Service (NRCS) in accordance with the project reclamation plan. Agricultural lands will be reclaimed to landowner specifications, to the extent practical. In addition, a noxious weed management plan (Appendix I) will be implemented.	6.14, Appendix I
(8) Temporary and permanent housing	No adverse impacts anticipated. Temporary lodging needs will be filled in the form of rental housing or the use of hotels, which could provide short-term economic benefits.	6.1

Selection Criteria	Potential Adverse Effects from Project	Section Addressed
(9) Temporary and permanent skilled and unskilled labor	Badger Wind will encourage its Balance-of-Plant (BOP) contractor to source materials and the construction labor force from within North Dakota and/or areas near the Project, as commercially reasonable. Badger Wind anticipates its BOP contractor to develop a sourcing and workforce plan that seeks to achieve this goal within the parameters of the Project's requirements for safety, quality, schedule, and budget.	3.6
Cumulative Impact:		
The cumulative effects of the location of the facility in relation to existing and planned facilities and other industrial development	Development of the Project would not conflict with existing development plans of state, local, or private businesses. Cumulative impacts from the Project will be minimized by siting project infrastructure within areas of existing development to the extent practicable, including utilizing existing public and farm access roads as possible. The North Dakota Wind (I and II) facilities are located approximately 27 miles east of the Project Area.	6.2, 8.8

3.4. Policy Criteria⁴

In accordance with Section 69-06-08-01(6), "[t]he [C]ommission may give preference to an applicant that will maximize benefits that result from the adoption of the following policies and practices, and in a proper case may require the adoption of such policies and practices. The [C]ommission may also give preference to an applicant that will maximize interstate benefits." Policy Criteria considered by the Commission are summarized in **Table 3-4**, below.

Table 3-4: Summary of Policy Criteria

Policy Criteria	Applicant's Policies and Practices	Section Addressed
Recycling of the conversion byproducts and effluents	N/A	N/A
Energy conversion through location, process, and design	The Project has been sited and designed to maximize energy conversion efficiency.	1.2, 3.5
Training and utilization of available labor in this state for the general and specialized skills required	The Project will use skilled and trained laborers from North Dakota, to the extent feasible, within the parameters of the Project's safety, quality, budget, and schedule requirements.	6.1

⁴ As defined in NDAC 69-06-01-01(12), policy criteria are "criteria that guide and govern the selection of energy conversion facility sites and transmission facility corridors and routes in order to maximize benefits during the construction and operation of a facility."

Policy Criteria	Applicant's Policies and Practices	Section Addressed
Use of a primary energy source or raw material located within the state	Energy generated by the Project will come from the wind resource within North Dakota. In addition, the Project, to the extent commercially reasonable, will utilize local sources for construction materials such as gravel for roads and turbine pads and aggregate for concrete.	1.2.4
Not relocating residents	The Project will not result in the relocation of residents.	6.1
The dedication of an area adjacent to the facility to land uses such as recreation, agriculture, or wildlife management	The Project will not interfere with adjacent land uses. As such, Badger Wind does not currently anticipate dedicating any adjacent areas for land uses such as recreation, agriculture, or wildlife management.	6.2, 6.15
Economies of construction and operation	With a nameplate capacity of 251.6 MW, Badger Wind will benefit from the economies of scale associated with project construction and operation. Because wind energy projects typically incur one-time costs that do not differ substantially with the scale of the project, larger-scale projects benefit from economies-of-scale advantages as they provide greater output with similar fixed costs. Examples of such fixed costs include procurement and construction of the project substation, crane mobilization, and on-site office space.	3.6
Secondary uses of appropriate or associated facilities for recreation and the enhancement of wildlife	None. The Project is compatible with existing wildlife and recreational uses.	N/A
Use of citizen coordinating committees	Badger Wind has coordinated and will continue to coordinate with landowners, local businesses, and organizations in the vicinity of the Project Area.	9.0
A commitment of a portion of the energy produced for use in this state	Energy generated by the Project will interconnect to the power grid at the Wishek Junction substation. The energy provided by the Project will be positioned to meet the local, regional, or national demand for renewable energy, and/or corporate or government renewable energy goals.	2.1
Labor relations.	No adverse impacts are anticipated.	N/A
The coordination of facilities	The Project has been sited with the consideration of existing facilities and facility corridors.	3.5, 3.6, 6.3, 6.4

Policy Criteria	Applicant's Policies and Practices	Section Addressed
Monitoring of impacts	Badger Wind will monitor construction activities and use appropriate best management practices (BMPs) during project construction. During project operation and reclamation activities, Badger Wind will monitor the Project to assess impacts and to achieve compliance with all requirements set forth in the Certificate. The Project's Bird and Bat Conservation Strategy (BBCS) (Appendix H) and Reclamation and Weed Management Plan (Appendix I) outline wildlife and revegetation monitoring measures, respectively.	5.1, 5.2, 6.14, 6.15, Appendix H , Appendix I
A commitment to install lighting mitigation technology for wind energy conversion facilities subject to commercial availability and FAA approval	The Project will utilize a light-mitigating technology system that is consistent with applicable requirements, subject to FAA approval.	5.2, 6.6

3.5. Design and Construction Limitations

In siting the Project, Badger Wind considered design and construction limitations related to the Project Area's wind resource, environmental constraints, setback requirements, interconnection to the transmission grid, and local landowner input. Badger Wind evaluated meteorological conditions within and around the Project Area to confirm that a 251.6-MW wind energy project would be economically viable at this location (refer to **Section 1.2.6**).

Interconnection capacity to the existing electrical grid was also considered in the design of the Project. Badger Wind has a generation interconnection queue position in MISO's DPP-2018-APR-West cluster and is currently under Generation Interconnection Agreement negotiations. Affected system studies with Minnkota Power Cooperative (MPC) and the Southwest Power Pool (SPP) are currently underway. Badger Wind is in the process of identifying an offtaker for the Project's energy output.

Site control has also been critical to the design of the Project. Badger Wind has secured or is in the process of finalizing voluntary wind energy lease agreements and easements with landowners for the Project Area.

Furthermore, site-specific constraints were considered in the design and siting of the Project. Badger Wind sited the Project to avoid or minimize impacts to sensitive environmental resources to the extent possible. Setbacks from occupied residences, non-participating landowner properties, and existing infrastructure, as required by the Commission and Logan County, were also considered in the design and siting of the Project. **Section 6.0** includes a more detailed discussion of site-specific resources and the BMPs and mitigation measures that will be implemented to avoid or minimize impacts to these resources.

3.6. Economic Considerations

The wind resource in a given area is the primary driver of the economic viability of wind energy projects. As discussed in **Section 1.2.6**, the meteorologic conditions within the Project Area are ideal for the development and operation of a wind energy project.

The Project would utilize the excellent wind resource within the Project Area to generate and supply renewable energy. Once operational, the Project would provide approximately USD 1.2M annually in direct economic benefits in the form of production taxes, in addition to direct payments to participating landowners. Furthermore, during construction, the Project would also result in indirect economic benefits to the area, including increased demand at local gas stations, hotels, and restaurants, and local purchases of construction supplies and materials including gravel, concrete, aggregate, and/or fuel.

4. DESCRIPTION OF THE PROPOSED FACILITY

4.1. Project Components

Project components, including turbines, associated facilities, and temporary facilities, are described in the following subsections. The project layout and estimated project facility impacts are also described. **Figure 2: Facilities Layout** shows the locations of the proposed project infrastructure described below.

4.1.1. Wind Turbines

The following subsections describe characteristics of the wind turbines that would be used for the Project.

4.1.1.1. Wind Turbine Technology and Characteristics

Wind turbines generate electricity by converting the kinetic energy of wind into rotational energy of the rotor. A hub connects the rotor and main shaft to a system of gears connected to a generator. The rotor utilizes blade pitch regulation and other technologies to optimize power output under various wind speeds and site conditions. Most modern wind turbines generate electricity in conditions ranging from approximately 2.7 to 24.6 m/s (about six to 55 miles per hour) (ACP 2021). Power electronics will convert generator output to the necessary output voltage and frequency, and an integrated wind speed and direction monitoring system will control “yaw” motion, maintaining the appropriate position of the turbine given current wind conditions. Each turbine will have low-noise trailing edge (LNTE) serrations on the turbine blades to reduce sound impacts. LNTE serrations will be the same color as the blades and will cover 20 to 30 percent of the trailing edge of the outboard blade length.

For analyses completed within this Application, Badger Wind utilized the GE 3.4-MW (3,400-kilowatt [kW]) turbine, the model currently being considered for the Project. **Table 4-1** describes the characteristics of the GE 3.4-MW turbine. However, wind turbine technology is rapidly evolving to become more efficient in converting wind energy to electricity. As a result, the turbine model ultimately selected for the Project may be different, depending on the technology available. Badger Wind plans to select the most appropriate technology in terms of cost effectiveness and optimization of land and wind resources. Regardless of the model selected, Badger Wind has sited the Project so that all proposed turbine locations meet exclusion and avoidance area criteria, as well as setbacks required by the Commission and Logan and McIntosh Counties for a turbine with an up to 98-meter (approximately 322.5-foot) hub height, an up to 140-meter (approximately 459.3-foot) rotor, and a total tip height of 168 meters (approximately 551.2 feet), thus providing flexibility in the selection of the turbine model. In addition, if the Project will utilize a model other than the GE 3.4-MW turbine, Badger Wind will provide the updated turbine specifications, sound modeling, and shadow flicker modeling to the Commission to demonstrate compliance with applicable requirements.

Table 4-1: Wind Turbine Characteristics

Characteristic	GE 3.4 MW
Nameplate capacity	3,400 kW
Hub height ¹	98 m (322.5 ft)
Rotor Diameter	140 m (459.3 ft)
Total height ²	168 m (551.2 ft)
Cut-in wind speed ³	3 m/s
Rated capacity wind speed ⁴	13 m/s
Cut-out wind speed (sustained) ⁵	26 m/s
Cut-out wind speed (gust)	35 m/s
Rotor Swept Area	15,394 m ²
Primary Turbine Positions	74
Alternate Turbine Positions	5

¹ Hub height = the turbine height from the ground to the top of the nacelle

² Total height = the total turbine height from the ground to the tip of the blade in an upright position

³ Cut-in wind speed = wind speed at which the turbine begins operation

⁴ Rated capacity wind speed = wind speed at which the turbine reaches its rated capacity

⁵ Cut-out wind speed = wind speed at which the turbine shuts down operation

The Project nameplate capacity will be up to 251.6 MW. The Project's interconnection request will permit up to 250 MW to be delivered to the grid.

4.1.1.2. Rotor

The rotor diameter associated with the turbine model currently being considered is 140 meters (approximately 459.3 feet). The rotor consists of three blades mounted to a hub, which is then connected to the nacelle. The nacelle houses the generator, brake, and cooling systems, as well as other mechanical and electrical components.

4.1.1.3. Towers

Turbine towers will be composed of cylindrical tapered steel and typically will include three to four sections joined together by factory-fabricated welds. Welds are automatically controlled and inspected ultrasonically according to American National Standards Institute (ANSI) specifications. Tower surfaces are also sandblasted and coated by the manufacturer for protection against corrosion, generally in non-glare white, off-white, or gray. Tower sections within which the nacelle is mounted will be manufactured from steel plate and will have a hub height up to 98 meters (322.5 feet). Service platforms are provided at each level to allow access up the tower to the nacelle.

Each tower contains a control panel that houses electronic and communications equipment, including a wind speed and direction sensor that signals when winds are sufficient for operation of the turbine. An automated SCADA system will be located at the project substation to provide local and remote monitoring and control of turbine equipment and performance.

4.1.1.4. Lightning and Ground Protection

Lightning and ground protection for all project equipment is designed and constructed in accordance with prudent industry standards to maintain safety and reliability. Grounding and shielding components will be integrated into the foundation and structure of all equipment and conductor lines. Each turbine will contain conductive elements within the blades and a complete network of grounding and shielding components within each foundation, tower, and turbine.

4.1.1.5. Lighting

Turbines will be lit to satisfy the minimum requirements set forth by the FAA. The Project will also adhere to the light-mitigating technology requirements specified in NDCC Section 49-22-16.4. Subject to FAA approval, Badger Wind plans to use an ADLS. ADLS is a sensor-based system designed to detect aircraft as they approach an obstruction or group of obstructions. The system will function by monitoring the area near the Project (typically within three nautical miles) for aircraft. When an aircraft is detected in proximity to the Project, the FAA lights will automatically turn on until they are no longer needed by the aircraft (e.g., the aircraft clears the area). The components and specific locations of the ADLS system will be dependent on FAA's review of turbine technology, terrain, and other factors. The ADLS currently contemplated for the Project includes one ADLS tower that will be up to 90 meters high and will be set within a 50-square-foot enclosed area. Lighting of ancillary structures will be minimized, and downward-facing lights and/or motion-sensing lights will be installed, as practicable.

4.1.1.6. Foundation

Each turbine will be bolted to a concrete foundation. Foundation size and design will be finalized once a geotechnical analysis is complete, and the turbine model has been selected. For the purposes of this Application, Badger Wind estimates that the foundation will be approximately 65 feet in diameter and seven to 13 feet in depth.

4.1.1.7. Associated Facilities

Associated facilities include access roads, an underground electrical collection and communication system, permanent MET towers, an O&M facility, a project substation, and a temporary laydown yard.

4.1.1.8. Access Roads

Access roads will service each turbine location and will consist of compacted gravel roads. Locations of access roads will be selected in consultation with landowners to avoid or minimize impacts to existing land uses and the environment, to the extent practical. The temporary disturbance area for access roads may be up to 100 feet wide, and permanent road width will be approximately 16 feet wide. Access roads will be constructed with locally sourced material, if available. The access roads are designed to support the size and weight of large component trucks and maintenance vehicles. Following construction, temporary impact areas will be restored, as practicable, to pre-construction conditions, pursuant to landowner agreements.

4.1.1.9. Electrical Collection System and Communication System

An underground electrical collection system consisting of buried cables will interconnect all turbines to the project substation. The underground collection system will operate at a voltage up to 34.5 kV, and its location has been selected to minimize land impacts. A small number of aboveground junction boxes will be placed throughout the Project and will be marked with bollards or other markings. A temporary disturbance width of 75 feet will be used during construction to allow for the installation of the underground cable. No permanent impacts are anticipated aside from minor impacts associated with aboveground junction boxes, as land will be restored to pre-construction conditions, to the extent possible, following installation.

4.1.1.10. Meteorological Towers

Up to three permanent MET towers with ADLS will be constructed and will remain for the lifetime of the Project. The MET towers will provide data critical to assessing performance via instruments such as anemometers, wind vanes, temperature probes, and other atmospheric monitoring sensors that will be installed at several elevations on each project permanent MET tower. MET towers will also include data loggers and communication systems that provide remote reporting of the data being collected.

Currently, five potential permanent MET tower locations are being considered and are shown on **Figure 2: Project Facilities**; permanent MET towers will be constructed at only three of these locations. Permanent MET tower locations will be selected depending on the final layout of the Project; each MET tower will have sensors up to 98 meters above ground level (AGL) with a total height of approximately 101 meters AGL to allow a lighting protection system to extend above the upper-level sensor. If guy wires are required for MET towers, these will be marked with avian flight diverters. Temporary impacts required for MET tower construction will cover approximately 0.5 acres, and MET towers are anticipated to have a permanent impact footprint of 50 × 50 square feet.

4.1.1.11. O&M Facility

An O&M facility will be sited adjacent to the project substation and will serve as the operational offices for project staff and serve as a storage area for parts, equipment, and materials for the Project. The building at the O&M facility will be up to 5,000 square feet and will be sited within a one-acre enclosed parking lot. During construction, the approximate temporary impact area will be up to four acres. The permanent area of disturbance will be up to two acres, with the remaining acreage reclaimed following construction.

4.1.1.12. Project Substation

The project substation will be sited adjacent to the O&M facility and will be designed to step up voltage from the 34.5-kV collection system to the 230-kV transmission line voltage. The two-acre permanently enclosed substation area will include a control house, transformers, and steel for the high-voltage transmission line. The approximate area of temporary impacts will be up to five acres.

4.1.1.13. Temporary Facilities

Temporary facilities required for the construction of the Project include a three-acre temporary batch plant, as well as one 15-acre laydown yard for construction offices and an additional seven-acre multi-purpose laydown area to support the Project's construction activities. In addition, the Project may require a temporary ten-acre marshaling yard to assist with logistics during turbine component deliveries. Temporary crane paths have been sited to follow proposed access roads, collection line and existing grade when traveling between turbines. A temporary area, up to 100 feet wide, will be cleared of vegetation and large debris for use when cranes are traveling between turbines. Temporarily impacted areas will be restored to pre-construction conditions to the extent practicable, pursuant to landowner agreements.

4.2. Project Layout

As described in **Section 1.2.3**, the project layout consists of 79 potential wind turbine locations; this number includes five alternate turbine locations. In addition to turbines, the project layout includes proposed locations for collection and communication lines, access roads, the O&M facility, project substation, ADLS, and five potential locations for permanent MET towers (of which three will be constructed). The project layout is designed to accommodate the selected turbine model, as well as other turbines up to 98 meters in height, with an up to 140-meter rotor diameter and a total tip height of 168 meters.

Badger Wind has designed the Project to optimize electrical generation and efficiency while minimizing potential impacts to existing resources, infrastructure, and land use. Badger Wind has coordinated with landowners regarding infrastructure placement and has utilized existing roads, driveways, field edges, and other previously disturbed areas for access roads to the extent practicable. Badger Wind has worked and will continue to work diligently with its landowner partners throughout project development.

The Project has been sited to comply with the setback requirements of the Commission, as well as Logan County. Where setback requirements differ, the Project will adhere to the more stringent requirement. McIntosh County has not enacted zoning and, therefore, does not have setback requirements for wind energy projects; in these cases the Commission setback requirements have been used for the Project. Applicable setback requirements, as well as the Project's voluntary setback commitments, are identified in **Table 4-2**. Setbacks are measured from the closest edge of the turbine tower base to the closest edge of the referenced feature.

Table 4-2: North Dakota Public Service Commission and County Setback Requirements

Entity	Turbine Setback ¹
North Dakota Public Service Commission	
The geographic center of an ICBM launch facility or launch control facility	Areas within 1,200 feet of the geographic center
Direct line between an ICBM launch facility and a missile alert or launch control facilities to avoid microwave interference	Areas within 30 feet (9.14 meters) on either side of a direct line between an ICBM launch facility and a missile alert or launch control facility

Entity	Turbine Setback ¹
Nearest edge of an interstate highway or state roadway ROW	1.1 times turbine height
County or maintained township roadway	1.1 times the height of the turbine plus 75 feet from the centerline of the roadway
Nearest edge of a railroad ROW	1.1 times the height of the turbine
Nearest edge of a 115-kV or higher-voltage transmission line ROW	1.1 times the height of the turbine
Property line of a non-participating landowner	1.1 times the height of the turbine ²
Inhabited rural residence of a non-participating landowner	3 times the height of the turbine ³
Inhabited residence or community building	A wind energy conversion site must not include a geographic area where, due to the operation of the facility, the sound levels within 100 feet of an inhabited residence or a community building will exceed 45 dBA ⁴
Logan County	
Turbine setback from the center of the existing ROW of the nearest public road	200 feet
Turbine setback from the center of the existing ROW of the nearest aboveground communication and electrical lines	200 feet
Wind Energy Facility Perimeter	2.5 times the rotor diameter of the turbine
Turbine setback from the nearest occupied dwelling, commercial building, or publicly used structure or facility	1.25 times the turbine total height or 750 feet, whichever is greater
Building and structure setback from county and state highway ROW	200 feet from county and state highway ROW
Building and structure setback from county road ROW	200 feet from the county road ROW
Tree plantings and shelterbelts planting setback from center of all roads (north, south, west, and east)	200 feet from center of all roads (north, south, west, and east), unless the guidelines set forth by the USDA-NRCS offices allow for a lesser setback
Non-farm structure setback from any public road ROW and 50 feet from any lot line of any lot of record	200 feet
Non-farm structure setback from any lot line of any lot of record	50 feet

Entity	Turbine Setback ¹
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¹ Setbacks are based on a turbine up to 98 meters in hub height with an up to 140-meter rotor diameter and/or a total tip height of 168 meters. Required setback distances were converted and rounded to the next meter to ensure compliance.

² As set forth in NDAC Section 69-06-08-01(2), a variance may be granted if an authorized representative or agent of the permittee and affected parties with associated wind rights file a written agreement expressing all parties' support for a variance to reduce the setback requirement in this subsection. A non-participating landowner is a landowner who has not signed a wind option agreement or a wind easement, as defined in NDCC Chapter 17-04, with the permittee of the wind energy conversion facility.

³ As set forth in NDAC Section 49-22-05.1(4), a variance from this setback requirement may be granted if an authorized representative or agent of the permittee, the non-participating landowner, and affected parties with associated wind rights file a written agreement expressing the support of all parties for a variance to reduce a setback requirement. A non-participating landowner is a landowner who has not signed a wind option or an easement agreement with the permittee of the wind energy conversion facility as defined in NDCC Chapter 17-04.

⁴ The sound level avoidance area criteria may be waived in writing by the owner of the occupied residence or community building, as provided in NDAC Section 69-06-08-01(4).

4.3. Estimated Project Facility Impacts

As stated above, the project layout includes 79 potential turbine locations. Turbines and other project infrastructure have been sited to meet applicable Commission and Logan County setbacks; minimize environmental, cultural resource, and economic impacts; and optimize use of the wind resource. Of these locations, 74 turbines would be constructed. **Table 4-3** presents the approximate area of temporary and permanent impacts associated with all project infrastructure. Although only 74 turbines will be constructed, all 79 potential turbine locations and associated infrastructure (e.g., collection lines, access roads, etc.) have been included for calculations of potential impacts. Additionally, although only three permanent MET towers will be constructed, all five potential MET tower locations have been included for calculations of potential impacts. Furthermore, conservative temporary construction disturbance areas are assumed for these analyses. Thus, the actual area that will be disturbed is expected to be smaller than those reported herein.

Table 4-3: Summary of Temporary and Permanent Footprints from Project Facilities (acres)¹

Project Facility	Description of Footprint	Temporary ²	Permanent ²
Turbines	79 turbines (includes five alternates), 50-foot radius turbine pad, 250-foot radius temporary construction workspace	272.45	14.24
Access Roads	16-foot-wide road, 100-foot-wide temporary construction workspace	388.12	73.95
Crane Paths	100-foot-wide temporary disturbance area	34.24	0.00
Electrical Collection and Communication Lines	75-foot-wide corridor for collection lines	575.96	0.00
ADLS	0.5-acre ADLS tower site	0.47	0.06

Project Facility	Description of Footprint	Temporary ²	Permanent ²
MET Towers	Five possible locations are included, but only three permanent MET towers will be constructed (the current project layout includes two alternate sites); each MET tower location has a 50-square-foot permanent disturbance area	0.00	0.27
Project Facilities	Includes laydown/staging areas, O&M facility, and substation footprints	90.20	3.73 (2.05 project substation; 1.68 O&M facility)
Total		1,361.44	92.26

¹ Because the Project has collocated facilities, double counting of potential impacts has been accounted for by first calculating permanent impacts, then calculating temporary impacts from electrical collection and communication lines (ground disturbance), then turbine workspace, crane paths, access roads, and facility footprints.

² Rounding has been applied to all values.

5. PROJECT CONSTRUCTION, OPERATION, AND DECOMMISSIONING

5.1. Project Construction

Numerous activities must be completed prior to commercial operation of the Project. A preliminary list of required pre-construction, construction, and post-construction activities for the Project includes the following:

5.1.1. Construction Activities

- Pre-construction:
 - Geotechnical analysis
 - On-site micro-sighting field visits to review all proposed infrastructure
 - Design of high-voltage electrical system, overhead transmission line, underground collection system, and project substation
 - Design of turbine foundations, access roads, temporary facilities, and permanent associated facilities
 - Underground utility and oil and gas facility discovery
 - Procurement of all necessary turbine and associated facility components (towers, nacelles, blades, foundation materials, and transformers)
- Construction:
 - Construct temporary laydown yards and construction management facility
 - Construct temporary intersection modifications to facilitate turbine component delivery
 - Construct access roads and install underground collection lines
 - Construct permanent MET towers
 - Construct project substation
 - Install tower foundations and associated turbine electrical transformers
 - Erect tower components and set turbines
- Post-Construction:
 - Restore temporarily disturbed areas not intended for permanent aboveground facilities
 - Test facility

- Begin commercial production

Badger Wind will continue to coordinate with townships, McIntosh and Logan Counties, and/or the North Dakota Department of Transportation (NDDOT) to obtain necessary haul route permits. Badger Wind will also obtain necessary permits to cross or bore under state, county, and township roads for the installation of collection lines and will negotiate road use and maintenance agreements with the applicable county and township road authorities, as required. As needed, drainage systems and culverts will be installed or modified in accordance with all federal, state, and local regulations.

During construction, equipment and work vehicles will travel to and from the site. Peak construction is anticipated to be in summer during installation activities and early fall when the majority of the foundations, access roads, electrical, and substation work is taking place. Upon completion of construction, heavy equipment will be removed from the Project.

5.1.2. Construction Management

Badger Wind will be responsible for the coordination and scheduling of the following project construction activities:

- Obtaining necessary building, electrical, grading, road, and utility permits
- Project civil, structural, and electrical engineering
- Conducting surveying and geotechnical analysis
- Forecasting and planning project labor needs
- Facilitating subcontractor involvement
- Securing construction materials
- Scheduling and coordinating delivery of construction materials
- Overseeing construction tasks, including site and access road development, foundation excavation and pouring, electrical and communications installation, turbine and MET tower erection, substation installation, system testing, and ADLS installation
- Managing the project budget

Coordination between Badger Wind and construction teams will be ongoing throughout construction. Likewise, the construction manager will correspond with local authorities and landowners throughout the construction phase.

5.2. Commissioning

Once project construction has been completed, the Project will be comprehensively inspected and tested prior to commissioning. Each wind turbine component, as well as project electrical, meteorological, communication, and SCADA systems, will undergo testing and inspection.

5.3. Project Operation and Maintenance

Prior to commencement of project operation, O&M staff will be integrated into project construction, as appropriate for project coordination. Staff will work with construction management to facilitate transition from the construction phase to commissioning and commercial operation of the Project.

5.3.1. Supervisory Control and Data Acquisition System

Each wind turbine will be equipped with SCADA controller hardware, software, and database storage capability. This system will provide information on the generation, availability, meteorological conditions, and communications for each turbine, allowing for remote monitoring, reporting, troubleshooting, and control of turbine equipment and performance. The SCADA system enables constant monitoring of the Project and transmission of alerts of communication errors to a remote operations center. Permanent O&M staff will perform maintenance and service for the Project with the aid of this system.

5.3.2. Light-Mitigating Technology

Light-mitigating technology (ADLS) will be installed in accordance with applicable requirements and subject to FAA approval. See **Section 4.1.1.5** for additional details.

5.3.3. Maintenance Schedule

Badger Wind anticipates the following schedule for proposed maintenance activities:

- **First Service Inspection** — The first service inspection will occur one to three months following commissioning of the Project. The inspection will focus on oil filtering, greasing, and bolt tightening.
- **Semi-Annual Service Inspection** — Semi-annual inspections will begin six months after the first service inspection. These will primarily consist of lubrication and safety testing.
- **Annual Service Inspection** — The annual inspection will include lubrication, safety testing, bolt tightening, and a full check of components.
- **Two-Year Service Inspection** — The two-year inspection will include lubrication, safety testing, bolt tightening, a full component check, and terminal connector tightening.

- **Five-Year Service Inspection** — The five-year inspection will include lubrication, safety testing, bolt tightening, a full component check, inspection of the braking system, oil and grease testing, terminal connector tightening, and a balance check.

5.4. Decommissioning and Restoration

Once the Project has reached the end of its operational life, Badger Wind will decommission the Project per North Dakota Wind Turbine Decommissioning Guidelines (NDAC Article 69-09-09) and the Logan County Zoning Ordinance Section 6.11.4.4 (Restoration of Property). Unless waived by the Commission in accordance with NDAC Section 69-09-09-05(2), these actions will include the following:

- Dismantling and removal of all towers, turbine generators, transformers, fencing, overhead cables, inverters, substations, and other equipment
- Removal of underground cables to a depth of 24 inches, cables buried deeper than 24 inches will remain in place
- Removal of foundations, structures, and ancillary equipment to a depth of four feet
- Site restoration and reclamation to the approximate original topography that existed prior to construction of the facility with topsoil respread over the disturbed areas at a depth similar to that in existence prior to the disturbance
- Grading and restoring topsoil of areas disturbed by the facility and reseeding according to NRCS recommendations, unless the Commission approves an owner request signed by the applicable landowner identifying the surface features the landowner would like to keep in place and the reason the landowner prefers to keep those features

Pursuant to NDAC Section 69-09-09-06, Badger Wind will submit a decommissioning plan to the Commission prior to project operation. Badger Wind will comply with all applicable financial assurance requirements.

6. ENVIRONMENTAL ANALYSIS

6.1. Demographics

The following sections describe existing demographics, potential impacts, and proposed avoidance/minimization measures.

6.1.1. Existing Conditions

The Project is located in south-central North Dakota, in a predominantly rural agricultural region in Logan and McIntosh Counties. The Project Area overlaps portions of Red Lake and Starkey Townships and 11 unorganized territories. The closest incorporated community is the City of Wishek, which is near the eastern Project Area boundary. Demographic data for the Project Area was obtained from the U.S. Census Bureau Quickfacts website. Badger Wind has opted to use census data from 2019 because the COVID-19 pandemic significantly disrupted the U.S. Census Bureau's data collection efforts for the American Community Survey in 2020 (Villa Ross et al. 2021). Data are presented at the state and county levels in **Table 6-1**.

Table 6-1: Demographics in the Project Area

Counties and Townships	North Dakota	Logan County	McIntosh County
American Community Survey Population Estimates 1 July 2019	762,062	1,850	2,497
2019 Estimated Total Vacant Housing Units	56,455	287	527
Per Capita Income 2015–2019 (U.S. 2019 Dollars)	USD 36,062	USD 32,619	USD 32,131
Unemployment Rate (%)	1.8	0.5	0.2
Persons Living Below the Poverty Level (%)	10.6	13.2	13.9
Top Three Industries	1. Health care and social assistance 2. Retail trade 3. Manufacturing	1. Agriculture, forestry, fishing, and hunting 2. Health care and social assistance 3. Educational services	1. Agriculture, forestry, fishing, and hunting 2. Health care and social assistance 3. Construction

Sources: (U.S. Census Bureau 2019a; U.S. Census Bureau 2019b; U.S. Census Bureau 2019c)

According to the 2019 census, the population of Logan County was 1,850 people, showing a decrease of 6.9 percent from 2010. The county seat of Logan County is Napoleon, located approximately 8.9 miles northwest of the Project Area. The population of McIntosh County was 2,497 people in 2019, which represents a decrease of 11.2 percent from 2010 (U.S. Census Bureau 2019a). The county seat of McIntosh County is Ashley.

As shown in **Table 6-1**, the per capita annual incomes in Logan and McIntosh Counties are slightly lower than in North Dakota as a whole (U.S. Census Bureau 2019b). The unemployment rates in Logan and McIntosh Counties are 0.5 and 0.2 percent, respectively; those rates are lower than the state unemployment rate of 1.8 percent. The proportion of people living below the poverty line is moderately lower for the entire state, at 10.6 percent, compared to Logan and McIntosh Counties, at 13.2 and 13.9 percent, respectively. The top three industries in Logan County are agriculture, forestry, fishing, and hunting; health and social assistance; and educational services. McIntosh County has the same top two industries as Logan County, but construction is the third largest industry. Statewide, the health care and social assistance services industry employs the majority of workers, followed by retail trade and manufacturing (U.S. Census Bureau 2019b).

6.1.2. Demographic Impacts and Avoidance/Minimization Measures

The Project is expected to result in socioeconomic benefits for the local population and will not impact long-term population trends. The Project will be socioeconomically beneficial to landowners, local governments, and communities because it will provide additional income in the form of lease payments to landowners, which could raise the per capita income in Logan and McIntosh Counties. Badger Wind has designed the Project to minimize impacts to family farms and ranches to the extent practicable, and any economic losses are anticipated to be minor in comparison to additional income provided by the Project. Furthermore, the Project will increase the local tax base, thereby benefitting local governments and communities. Additionally, multiple studies have shown that property values are not impacted by the presence of a wind energy conversion facility.⁵

Approximately 400 temporary personnel, both skilled and unskilled, would be required for project construction. Badger Wind will employ up to ten full-time workers during operations. In 2022, prior to construction, Badger Wind will host an event to procure local workers. Badger Wind will encourage its BOP contractor to source materials and the construction labor force from within North Dakota and/or areas near the Project, to the extent commercially reasonable. Badger Wind anticipates its BOP contractor to develop a sourcing and workforce plan that seeks to achieve this goal within the parameters of the Project's requirements for safety, quality, schedule, and budget.

Non-local temporary workers would need temporary housing during the period of construction, which is expected to occur from September 2022 through October 2023. Although the Project may increase demand for housing during the construction phase, according to the U.S. Census Bureau's 2019: Community Survey 5-year Estimates, 887 vacant housing units may be present within Logan and McIntosh Counties. This number of potentially vacant housing units would be enough to house non-local workers throughout project construction. Furthermore, demand for lodging could provide a temporary increase in revenue in the area.

⁵ See Hoen, Brown, and colleagues (2013); Hoen, Wiser, and colleagues (2009); and Atkinson-Palombo and Hoen (2014). Furthermore, in two 2018 rulings relevant to this Application, the Commission concluded that there is "no record evidence that property values will be adversely affected," (2018a: paragraph 55) and "There was no credible showing that there will be quantifiable or qualitative effect on property value" (2018b: paragraph 60).

Construction of the Project could also provide temporary revenue increases in the area through increased demand for food services, fuel, goods, and services. Personal income could also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes.

Long-term beneficial impacts to the tax bases of Logan and McIntosh Counties, as a result of the construction and operation of the Project, will have an additional positive impact on the local economy in this area of North Dakota. In addition to the creation of jobs and personal income, the Project would pay an Electric Generation Tax of USD 2.50 per kilowatt times the rated capacity of the turbine, as well as one-half of one mill per kilowatt-hour of generated electricity (NDCC Section 57-33.2-04). Thus, Badger Wind would pay approximately USD 23.5M in taxes to Logan and McIntosh Counties over 30 years and would pay approximately USD 11.6M in state taxes to the State General Fund over the operational life of the Project.

The proposed Project could increase demand on the labor force in Logan and McIntosh Counties and for local housing during construction; however, the construction period is only temporary. Overall, Badger Wind anticipates that the Project will be socioeconomically beneficial to the local population and will not impact long-term population trends. Further, the Project would not result in relocation of residences, and turbine placement complies with applicable setbacks from occupied residences. The Project will also comply with the Commission's sound avoidance requirement outlined in NDAC Section 69-06-08-01. Thus, no additional mitigation measures are anticipated to be required.

6.2. Land Cover, Land Use, and Zoning

The following sections describe the existing land cover, land uses, and zoning within the Study Area and Project Area, potential impacts from construction and operation of the Project, and proposed mitigation measures.

6.2.1. Existing Conditions

6.2.1.1. Land Cover

The Study Area is in a rural and predominately agricultural area. Existing landcover within the Study Area and Project Area is characterized using LANDFIRE's Existing Vegetation Type (EVT) dataset (USGS 2020). Some cover types were grouped into appropriate broader categories to define the land cover types within the Study Area and the Project Area, as summarized in **Table 6-2**. The majority of the Study Area is cropland (57.6 percent), with mixed-grass prairie and planted grassland as the second and third most dominant land cover types, respectively. The Project Area is composed of the same dominant cover types with some slight variability in percentages. As detailed in **Table 6-2**, 14 other cover types compose less than 20 percent of the land cover within both the Study Area and the Project Area.

Table 6-2: Land Cover Types and their Relative Abundance in the Project Area

Land Cover	Study Area		Project Area	
	Acres	Percent	Acres	Percent
Badlands	6.2	<0.1	0.0	0.0
Cropland	72,543.8	57.6	12,382.5	39.3
Developed	76.2	0.1	7.8	<0.1
Herbaceous Wetland	6.4	<0.1	0.9	<0.1
Mixed-grass Prairie	22,528.6	17.9	9,206.0	29.2
Open Water	178.0	0.1	19.3	0.1
Pasture/Hayland	5,253.3	4.2	1,992.3	6.3
Planted Grassland	13,387.9	10.6	4,629.1	14.7
Planted Herbaceous	564.5	0.4	100.4	0.3
Planted Woodland	534.8	0.4	136.9	0.4
Prairie Pothole	285.0	0.2	100.8	0.3
Riparian Herbaceous	6,856.9	5.4	2,104.7	6.7
Riparian Woodland	30.3	<0.1	10.0	<0.1
Roads	3,507.8	2.8	776.0	2.5
Shrubland	35.2	<0.1	7.3	<0.1
Tallgrass Prairie	4.4	<0.1	1.6	<0.1
Wooded Draw/Ravine Woodland	154.8	0.1	38.1	0.1
Total	125,954.2	100	31,513.8	100

Source: (USGS 2020)

6.2.1.2. Land Use and Ownership

Land within the Study Area and Project Area is used primarily for agricultural production (crops and livestock). Smaller portions of the site are used for residential purposes (isolated farmsteads). Federal and state ownership interests are present in the Study Area and the Project Area, as shown in **Table 6-3. Figure 7: Existing Public Lands and Easements** shows the locations of public lands and easements in relation to the Study Area and Project Area.

Table 6-3: Land Ownership in the Study Area and Project Area

Agency	Acres in Study Area	Acres in Project Area
Bureau of Land Management	0	0
Grazing Allotments	0	0
U.S. Fish and Wildlife Service	7,001.5	2,418.0
Fee Owned Waterfowl Production Areas	101.5	0
Easements (grassland)	1,559	276
Easements (wetlands)	5,341	2,142

Agency	Acres in Study Area	Acres in Project Area
National Wildlife Refuges	0	0
U.S. Department of Agriculture	0	0
Conservation Reserve Program	0	0
State of North Dakota	20,201.23	4,819.01
Private Lands Open to Sportsmen	384.89	0
Wildlife Management Areas	0	0
North Dakota State Lands	19,816.34	4,819.01
Surface Trust Lands	692.85	14.62
Mineral Rights Trust Lands	19,123.49	4,804.39

Source: (North Dakota GIS Technical Committee 2021)

In North Dakota, the Bureau of Land Management (BLM) designates and manages livestock grazing allotments on public lands owned by the BLM, private lands, state lands, and lands under the jurisdiction of other federal agencies (BLM 2021). No BLM-managed grazing allotments are present within the Project Area or Study Area.

The Conservation Reserve Program (CRP) is a land conservation program administered by the U.S. Department of Agriculture (USDA) Farm Service Agency (FSA) with technical support provided by the USDA NRCS. Landowners can agree to enroll their land in the CRP, essentially taking the land out of agricultural production for a period of ten to 15 years, in exchange for annual payments. Most often, lands enrolled in the CRP are not identifiable using publicly available data. Badger Wind has coordinated with the state and local FSA and NRCS offices, as well as landowners, to identify any areas of CRP-enrolled land within the Project Area. At the time of submitting this Application, no CRP parcels have been identified.

The U.S. Fish and Wildlife Service (USFWS) manages fee-owned Waterfowl Production Areas (WPAs) to protect breeding, forage, shelter, and migratory habitat for waterfowl or wading birds, such as ducks, geese, herons, and egrets. WPAs provide opportunities for viewing wildlife and intact ecosystems. One fee-owned WPA is present in the Study Area, and none are present within the Project Area.

The USFWS also manages National Wildlife Refuges (NWRs) with the purpose of creating a network of lands and waters to conserve, manage, and restore the nation's wildlife, fish, and plant resources. No NWRs are within the Study Area or Project Area. The nearest NWR, Appert Lake, is located approximately 26 miles north of the Project Area.

USFWS grassland and wetland easements are present within the Study Area and Project Area. Although USFWS grassland easements protect the entirety of the parcel(s) subject to a given easement, only a wetland easement protects the wetland basin(s) present. In all, 1,559 acres and 5,341 acres of grassland and wetland easements, respectively, are within the Study Area. In all, 276 acres and 2,142 acres of grassland and wetland easements, respectively, are within the

Project Area. In some instances, these easements overlap; therefore, the total adjusted acreages for easements within the Study Area and Project Area are 5,422 and 2,228 acres, respectively.

In North Dakota, Private Land Open to Sportsmen (PLOTS) lands are private lands open to public use for hunting and bird watching. The PLOTS program offers rental payments to landowners in exchange for walk-in access for hunters during the state's hunting seasons. PLOTS lands are administered through an agreement between the NDGF and individual landowners and are managed by NDGF. Approximately 384.89 acres of PLOTS lands are present within the Study Area, and no PLOTS lands are in the Project Area. Three PLOTS parcels are located on the western side of the Study Area: one in a northwestern section inside the Study Area and two parcels in the southwestern section immediately adjacent to the Project Area. More information about the public use of these sites can be found in **Section 6.8**.

The NDGF also manages Wildlife Management Areas (WMAs) across the state. These areas are open to hunting, fishing, trapping, hiking, camping, and other forms of recreation. No WMAs are present in the Study Area or the Project Area. The nearest WMA is located 2.24 miles to the northeast in Logan County.

Badger Wind reviewed publicly available information to identify North Dakota Department of Trust Lands (NDDTL) within the Study Area and Project Area. NDDTL manages trust lands on behalf of the Board of University and School Lands. Surface trust lands generate income through leases for grazing or agricultural use. Mineral rights trust lands generate income through leases for oil and gas, coal, potash, and other mineral extraction. In all, 692.85 acres of surface trust lands and 19,123.49 acres of mineral rights trust lands are within the Study Area. Of these, 14.62 acres of surface trust lands and 4,804.39 acres of mineral rights trust lands are within the Project Area.

Water wells and oil and gas wells are within the Study Area and Project Area. In all, 74 domestic, stock, industrial, or observational water wells are in the Study Area. Of these, 21 are located within the Project Area (ND State Water Commission 2021). Ten dry oil and gas wells are within the Study Area; two of these are within the Project Area. No active oil and gas wells were identified (ND DMR 2022).

No concentrated residential developments are present within the Study Area or Project Area, though residences and farmsteads are present in both areas. In total, 61 residences or farmsteads are in the Study Area; of these, 23 are located within the Project Area.

6.2.1.3. Zoning

According to Section 6.11.3 of the amended Logan County Zoning Regulations (Logan County 2018), construction and operation of a wind energy facility in Logan County requires a Wind Energy Facility Siting Permit from Logan County. Badger Wind is coordinating closely with Logan County and plans to submit its Wind Energy Facility Siting Permit application in March 2022.

McIntosh County has not enacted a zoning ordinance; as such, the Project will not require any zoning permits/approvals from McIntosh County. According to a letter from the Chair of the

Board of Commissioners for McIntosh County, the Project is not located within any townships in McIntosh County that have their own zoning ordinances (**Appendix D**).

6.2.2. Land Cover, Land Use, and Zoning Impacts and Avoidance/Minimization

Construction of the Project will result in the conversion of a portion of the land within the Project Area from existing land uses to a renewable energy resource for the life of the Project. In addition, temporary land use impacts associated with construction of the Project may result in short-term changes to existing land use. Temporary land use impacts would be associated with marshaling and laydown areas, the temporary batch plant, crane paths, and installation of underground collection and communication lines. Following construction, these temporarily disturbed areas will be restored to their pre-construction land use. Temporarily disturbed areas will be reclaimed, fertilized, and reseeded according to NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission, as detailed in **Appendix I**.

Table 6-4 presents the anticipated impacts on land cover categories as a result of construction and operation of the Project.

Table 6-4: Project Summary of Land Cover Impacts

Land Cover Type	Impacts	
	Temporary (acres) ¹	Permanent (acres) ¹
Cropland	907.58	65.34
Developed	0.87	0.02
Mixed-grass Prairie	184.12	9.28
Pasture/Hayland	67.88	4.15
Planted Grassland	62.20	2.61
Planted Herbaceous	10.90	0.43
Planted Woodland	12.22	0.75
Prairie Pothole	0.48	0.00
Riparian Herbaceous	27.96	0.74
Riparian Woodland		0.00
Roads	87.23	8.94
Tallgrass Prairie		0.00
Wooded Draw/Ravine Woodland	0.01	0.00
Total	1,361.45	92.26

Source: (USGS 2020)

¹ Rounding has been applied to all values.

Construction of the Project will temporarily impact approximately 1,361.45 acres of land. Approximately 66 percent of the temporary impacts will occur on land categorized as cropland, and 14 percent of the impacts will occur on land categorized as mixed-grass prairie, with the remaining temporary impacts occurring on other land cover types. Impacts related to construction workspaces at turbine sites and access roads, the temporary batch plant,

installation of underground collection and communication lines, and use of crane paths and laydown yards will be temporary and will terminate with the completion of construction.

Impacts from turbines, access roads, the O&M facility, permanent MET towers, the ADLS tower, and the project substation will be long term and will convert existing land uses to a renewable energy source for the life of the Project. In total, the Project will impact approximately 92.26 acres of land during the life of the Project. Approximately 71 percent of this permanent impact will occur on land categorized as cropland, 10 percent will occur on land categorized as mixed-grass prairie, and the remaining permanent impacts will occur on other land cover types. Badger Wind designed the Project to minimize impacts to land use and land cover by collocating linear facilities (i.e., access roads, crane paths, and collection lines) to the extent practicable. In some cases, siting linear facilities in previously disturbed areas and minimizing siting in unbroken grasslands means the facilities will traverse longer distances.

Badger Wind does not expect that the permanent conversion of 92.26 acres of land to a renewable energy source will impact broader existing land use patterns. Agricultural activities, including grazing and cultivation, may continue in the Project Area during the life of the Project. The Project also does not conflict with the existing development plans of state, local, or private entities within the Project Area because the Project generally avoids developed areas. Lease payments will be paid to landowners for placement of project facilities to offset loss of income from permanent impacts to land used for agriculture.

As there are no BLM-managed grazing allotments present within the Project Area or Study Area, the Project will not impact these resources, and no mitigation is necessary.

Badger Wind is coordinating with the state and local FSA and NRCS offices, as well as landowners, to identify CRP areas within the Project Area and Study Area. To date, no parcels enrolled in the CRP have been identified in the Project Area; however, if identified in further coordination with landowners, Badger Wind will coordinate with the landowners and these agencies to determine appropriate reclamation programs for temporarily disturbed land or offset payment requirements for any land that is permanently impacted by the Project.

No USFWS-managed NWRs were identified within the Project Area or Study Area. USFWS grassland, waterfowl, and wetland easements are present in the Project Area. Underground collection lines are sited on USFWS grassland easements in two areas. Badger Wind will bore under these USFWS grassland easements to avoid impacts when installing the underground collection lines; accordingly, no impacts to these easements are anticipated. Impacts are anticipated to occur within USFWS wetland easements in the northeastern portion of the Project Area; however, the Project obtained leases for these parcels prior to the USFWS obtaining the easements. As such, there is no regulatory requirement to avoid impacts to these easements; nevertheless, Badger Wind will avoid impacts to wetlands within these parcels, as feasible. Badger Wind has been coordinating regularly with the USFWS Kulm office to determine best approaches for construction to minimize or avoid impacts to the USFWS easement areas and will obtain any required USFWS authorizations.

No PLOTS lands are present within the Project Area. Because no PLOTS lands are within the Project Area, the Project will not impact PLOTS lands. Additionally, because no WMA are within the Project Area, the Project will not impact these resources.

Badger Wind has designed the Project to avoid permanent impacts to state-managed land, including NDDTL-managed surface and mineral trust lands to the extent practicable; nevertheless, temporary and permanent impacts totaling 249 acres and 19 acres, respectively, will occur. These impacts are associated with construction of access roads, crane paths, electric fiber, turbines, and MET towers.

Impacts to water wells will be avoided. Badger Wind may potentially use existing wells or create new wells, as necessary. Badger Wind has voluntarily sited turbines 168 meters (approximately 551 feet) (turbine tip height) away from inactive oil and gas wells in the Project Area; no active oil and gas wells were identified within the Project Area. Further discussion of potential impacts and mitigation strategies for inactive oil and gas wells within the Project Area are discussed in **Section 6.11**.

As noted above, Badger Wind is coordinating with Logan County and plans to file its Wind Energy Facility Siting Permit application in March 2022. Badger Wind has designed the Project to comply with the applicable Logan County permitting requirements. McIntosh County does not currently have a zoning ordinance; therefore, no impacts to zoning are anticipated.

Following decommissioning, the Project Area will be restored to natural topography contours to the extent possible.

6.3. Public Services

The following sections describe existing public services in the Study Area and Project Area, potential impacts, and proposed avoidance/minimization measures.

6.3.1. Existing Conditions

Data identifying public services and infrastructure in the Project Area, including transportation ROWs, known transmission lines, and telecommunication facilities, were analyzed to assess potential project impacts. No missile silos were identified within the Project Area or Study Area. Specific categories of public infrastructure are discussed below. **Figure 8: Existing Infrastructure** depicts existing public infrastructure in the Study Area.

6.3.1.1. Local Services

The Project is located in rural south-central North Dakota. A network of roads and utility infrastructure provides access, electricity, water supply, and telephone service to rural residences, farmsteads, small industry, and unincorporated areas. Water wells and septic systems are typically used in the Project Area. The nearest city, Wishek, borders the Project Area and has its own police department, which will service the southern portion of the Project Area within McIntosh County. Napoleon, a city located 8.7 miles northwest of the Project Area,

maintains a police department that will service the northern portion of the Project Area within Logan County. The entire Project Area is within the Wishek Rural Fire and Ambulance Districts.

6.3.1.2. Electrical Services

Electrical service in the Project Area is provided by KEM Electric Cooperative, Inc., and the MDU. Electrical infrastructure includes distribution and transmission lines. According to the publicly available U.S. Energy Mapping System, two high-voltage transmission lines (230 kV and 345 kV) transect the Project Area (EIA 2019). Additionally, small underground and overhead distribution lines are present, which serve nearby farmsteads, residential properties, and commercial areas. One existing substation was identified within one mile of the northeast boundary of the Project Area.

6.3.1.3. Roads

Existing road infrastructure in the Study Area and Project Area includes county and township roads that typically follow section lines, as well as farmstead driveways and farming access roads. No federal highways go through the Project Area. North Dakota State Highways 13 and 3 are the main access routes to the Project Area and to nearby communities. County roads and township roads are either two-lane paved roads or gravel roads and will abut private access roads to the proposed turbine locations. Existing roads will also be improved in coordination with Logan and McIntosh Counties.

According to NDDOT data, the average daily traffic of Highway 13 and Highway 3 was 350–749 vehicles in 2019. The section of Highway 13 that crosses the city of Wishek recorded an average usage of 750–1,999 vehicles in 2019 (NDDOT 2020).

6.3.1.4. Railroads

The Soo Line Railroad runs north–south through approximately 7.1 miles of the northern portion of the Project Area. The railroad travels through the City of Napoleon and the City of Wishek.

6.3.1.5. Water Supply

Rural water is supplied to the Project Area by the South Central Regional Water District (ND DWR 2021a). Rural residences in the area also commonly utilize private wells for household and agricultural purposes. According to data from the North Dakota Department of Water Resources (ND DWR), 74 domestic/irrigation/observational water wells are in the Study Area; of these, 21 are within the Project Area (ND DWR 2021b).

6.3.1.6. Telephone, Microwave, Radio, and Television Communications

A Communication Tower Study was conducted within the Project Area to identify communication towers and antennas licensed by the Federal Communications Commission (FCC) in the Project Area (**Appendix C**). Twenty-three FCC-licensed antennas were identified in the Project Area, 11 of which are located on communication towers located in the Project Area; the other antennas are likely affixed to other structures, such as silos, rooftops, and monopoles. Six communication

tower structures are in the Project Area; four of the towers are land mobile towers, one is a cellular tower, and one contains land mobile, cellular, and microwave antennas. No amplitude modulation/frequency modulation (AM/FM) radio towers are in the Project Area.

Five towers in the Project Area provide land mobile service. Additionally, a Land Mobile and Emergency Services Report completed for the Project identified 243 mobile licenses with radii that overlap the Project Area (**Appendix C**).

One microwave tower is in the Project Area. The Microwave Path Analysis conducted for the Project identified two microwave beam paths between the City of Forbes and City of Wishek that overlap the Project Area (**Appendix C**).

No AM or FM radio towers were identified within 30 kilometers (km) of the Project Area. The nearest AM station is KSJB, which is 80.51 km northeast of the Project Area. The nearest FM station is K263AP, which is 65.03 km west of the Project Area.

The Off-air TV Analysis conducted for the Project concluded that no television (TV) stations are located within the Project Area (**Appendix C**). Nineteen licensed and operating TV stations were identified within 150 km of the Project Area (TV stations within 150 km are most likely to provide off-air coverage that could overlap with the Project Area). The nearest TV station is KJRE, which is 48 km east of the nearest proposed turbine. Summary tables of FCC-licensed communication towers and antennae, regional emergency mobile service licenses, microwave beam paths, and licensed and operated TV stations that can be found within or in proximity to the Project Area can be found in **Appendix C**.

6.3.2. Public Services Impacts and Avoidance/Minimization Measures

The following subsections discuss potential impacts and proposed avoidance/minimization measures.

6.3.2.1. Local Services

Impacts to local services in and around the Project Area are not anticipated; therefore, no mitigation is required.

Construction and operation of the Project is not expected to impact the availability of emergency services. If emergency services are required during construction or operation of the Project, the nearby emergency services infrastructure (e.g., law enforcement, fire departments, etc.) is suitable to address project-related emergencies without negatively impacting the availability of these services for the local populace.

Badger Wind will coordinate with emergency service providers to determine appropriate safety precautions and standards and to develop an Emergency Response Plan to implement these precautions and standards. Turbines will be clearly numbered for identification and emergency response, and Badger Wind will provide a map identifying turbine locations and numbers to local emergency response coordinators.

6.3.2.2. Electrical Services

The Project will help meet regional demand for electricity, and as a result the Project is anticipated to have a positive effect on the electrical services in the region. Badger Wind will utilize North Dakota One Call prior to construction to identify existing utilities and will coordinate with facility owners to minimize potential impacts to existing infrastructure. Badger Wind anticipates that electrical services for routine operations will be provided by a local utility.

6.3.2.3. Roads

Existing roadways within the Project Area will be utilized to the extent feasible; however, construction of new access roads will be required to provide access to the proposed turbine locations. Newly constructed permanent access roads will be approximately 16 feet wide. Access roads will be constructed in locations that minimize impacts to the environment and existing land uses and will support the size and weight of maintenance vehicles. Following construction, the temporarily affected areas will be restored to pre-construction conditions, to the extent practicable.

During the construction phase, temporary impacts are anticipated on some public roads. Roads will be used to transport equipment and personnel to and from the Project Area and between project facilities. Construction traffic will use the existing county, state, and federal roadway system to access the Project Area and deliver construction materials and personnel. State Highways 13 and 3 are the main access routes into the Project Area and will likely be used as routes to transport materials and equipment; however, the exact routes will be determined closer to construction and in coordination with local roadway authorities, as appropriate.

Construction activities will increase the amount of traffic using local roadways, and may temporarily affect traffic numbers in the area, but such use is not anticipated to result in adverse traffic impacts. Minor, short-term traffic delays within and near the Project Area may occur during turbine and equipment delivery and construction activities.

Badger Wind's road use is expected to have a minimal effect on existing road infrastructure and will comply with all applicable federal, state, and local requirements. Industry construction and operation standards and prudent utility practices will also be followed. Badger Wind will coordinate with applicable local and state road authorities so that all applicable permits are obtained, delivery plans are communicated, and traffic management plans are implemented where necessary. Badger Wind will negotiate road use and maintenance agreements with Logan County, McIntosh County, and the townships, if needed. If necessary, Badger Wind will work with local governments to develop construction traffic plans and adhere to recommended avoidance/minimization strategies. Development of a Road Use Agreement for the Project is currently underway.

After construction is complete, traffic impacts during the operations phase of the Project will be minimal. Operation and maintenance activities will not noticeably increase traffic in the Project Area, as these activities tend to be sporadic and spread out within the Project Area. A small maintenance crew driving through the area in pickup trucks on a regular basis will monitor and

maintain the wind turbines as needed. There would be a slight increase in traffic for occasional turbine and substation repair, but traffic function will not be impacted as a result. Furthermore, the availability of existing roadways throughout the Project Area will allow access roads to turbines to extend from existing public roads directly to the turbines, thereby minimizing impacts on adjacent agricultural land.

Following completion of construction, per the terms of the Road Use Agreements with Logan and McIntosh Counties, affected roadways will be repaired or restored to a condition at least equal to the condition prior to construction of the Project. The temporarily affected areas will be restored to pre-construction conditions, to the extent practicable.

6.3.2.4. Railroads

Badger Wind will coordinate with Canadian Pacific Railroad for a crossing agreement for each crossing. Direct impacts to the Soo Line Railroad are not anticipated; therefore, mitigation measures for impacts to railroads are not required.

6.3.2.5. Water Supply

Water will be used during construction to provide dust control and as a component of concrete mixes. One temporary batch plant will be constructed in the Project Area to supply concrete for construction of the Project. The batch plant may be able to use rural water service but is more likely to require well water.

The O&M facility will likely require a new private water well. Water usage during the operating period will be similar to household volume: less than five gallons per minute. Badger Wind will coordinate with the South Central Water Authority Water District with respect to use of a potable water supply, as necessary. All required permits will be obtained for installation of a water well for the O&M facility. Use of water for operations will be negligible, and the Project will not require water appropriations beyond those provided at the O&M facility.

Project facilities have been sited to avoid water wells. The water supply for local nearby communities is not anticipated to be affected by the Project. Therefore, mitigation measures for impacts to the water supply are not required.

6.3.2.6. Telephone, Microwave, Radio, and Television Communications

Badger Wind will coordinate with utility companies to determine utility locations and will comply with North Dakota One-Call requirements.

The Communication Tower Study conducted for the proposed Project indicates that interference with communication towers is not likely to occur due to the proposed placement of the turbines (**Appendix C**).

Construction and operation of the Project are also not expected to impact landline phone service.

According to the Land Mobile and Emergency Services Report conducted for the proposed Project, the nearby land mobile services used for public safety, emergency response, and local

government communications are typically unaffected by the presence of wind turbines; these networks are designed to operate reliably in a non-line-of-sight environment. Many land mobile systems are designed with various base transmitter stations covering a large area that overlap with other transmitter sites. Additionally, the FCC requires that turbines are setback at least 77.5 meters from land mobile stations. Therefore, impacts to these services in the Project Area are not anticipated. Badger Wind will follow the FCC setback requirements from land mobile towers as recommended by the Land Mobile and Emergency Services Report.

In the unlikely event that fixed land mobile stations experience impacts to coverage due to project turbine placement, Badger Wind will address these issues on a case-by-case basis.

Two microwave beam paths are within the Project Area (**Appendix C**). None of the proposed turbines overlap with the Fresnel zones associated with the beam paths. Because the proposed turbines do not overlap with the associated two-dimensional Fresnel zones, impacts to the microwave beam paths from the Project are not anticipated.

No AM or FM stations are within 30 km of the Project Area. Therefore, no impacts are anticipated.

Construction of wind turbines has the potential to impact TV reception as a result of an obstruction in the line of sight between digital antennas at residences and the TV station antennas. The Off-air TV Analysis conducted for the Project identified six full-powered, licensed, and operating digital TV stations (call signs KJRE, KJRR, KBME-TV, KXMB-TV, KYFR-TV, and KQSD-TV) that may be impacted by the Project (**Appendix C**). These stations provide high-power transmission and, therefore, could experience reception interference if project turbines impact clear line-of-sight between the stations and receiving antennas. However, modern digital TV receivers have undergone significant improvements to mitigate the effects of signal scattering, which limits the likelihood that disruptions to digital TV would occur. TV reception at residences relying on cable or satellite TV service will not be impacted by construction or operation of the Project. If residents who rely on antennas experience signal disruption, Badger Wind will coordinate with the resident to mitigate the disruption. Impacts to low-power stations and translator stations are not anticipated to occur because those stations have a limited range.

Project information was provided to the U.S. Department of Commerce, National Telecommunications, and Information Administration (NTIA) for the department's review of proposed turbine placement in the Project Area. On 2 November 2021, the NTIA provided the project information to the Interdepartmental Radio Advisory Committee, which includes 20 federal agency members. On 21 December 2021, Badger Wind received correspondence from NTIA indicating that no agencies had issues with the project layout and no concerns regarding radio frequency blockage had been identified (**Appendix D**).

6.4. Human Health and Safety

The following sections describe existing conditions, potential impacts, and proposed avoidance/minimization measures related to human health and safety.

6.4.1. Existing Conditions

6.4.1.1. Air Traffic

Federal airspace is regulated by the FAA. Due to their height, wind turbines have the potential to affect airports and navigable airspace, both public and military. The FAA evaluates proposed projects for aeronautical compatibility and identifies potential issues related to military training areas and routes.

The Wishek Municipal Airport is the nearest public-use airport to the Project Area and is located approximately 1.5 miles southeast of the Project Area. The Wishek Municipal Airport serves a variety of aviation users including general aviation, air taxi, and military (AirNav 2021). No private airstrips registered with the FAA or North Dakota Aeronautics Commission are located within or in close proximity to the Project Area.

6.4.1.2. Electromagnetic Fields

Electromagnetic fields (EMF) are electric and magnetic fields that are present around any electrical device. Electric fields result from the voltage or electrical charges, and magnetic fields result from the flow of electricity or current that passes through substation transformers, transmission lines, power collection (feeder) lines, house wiring, and electrical appliances. Electric field intensity is associated with the voltage of the line, and magnetic field intensity is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. No discernible health impacts result from EMF associated with power lines (NIEHS 2002).

The sources of EMF for the Project will be electrical collection lines, the project substation, and wind turbines. EMF from electrical collection lines, transmission lines, and transformers dissipates rapidly with distance from the source. Generally speaking, higher-voltage electrical lines produce higher levels of EMF at the source before dissipating with distance. There is no federal standard for transmission line electric fields. No current North Dakota regulations pertain to magnetic field exposure.

The published results of scientific review panels have consistently concluded that neither electric fields nor magnetic fields are a known or likely cause of any adverse health effect at the long-term, low-exposure levels found in the environment.

6.4.1.3. Hazardous Materials/Hazardous Waste

The land within the Project Area is rural and used for agriculture. Potential hazardous materials associated with agricultural activities include petroleum products (fuel and lubricants), pesticides, and herbicides. Older farmsteads may also have lead-based paints, asbestos shingles, and polychlorinated biphenyls in transformers. Trash and farm equipment dumps are common in rural settings. Potential hazardous materials associated with oil and gas wells can include, but are not limited to, releases of petroleum products and chemicals, which may potentially have adverse effects to human health or the environment.

A Phase I Environmental Site Assessment was conducted for Badger Wind in October 2021, which reviewed the U.S. Environmental Protection Agency’s (EPA) Facility Registry Service (FRS); EPA’s Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal information; RCRA hazardous waste generators; the Department of Health’s Leaking Underground Storage Tank (LUST) List database; the Environmental Data Resources Recovered Government Archive (RGA) LUST database; and the North Dakota Department of Environmental Quality (NDDEQ) Underground Storage Tank (UST) Program database to identify sites that are listed on the Comprehensive Environmental Response, Compensation, and Liability Information System (also known as Superfund sites). A review of the LUST, UST and RGA LUST lists, as provided by Environmental Data Resources, has revealed that two LUST sites, seven UST sites, and one RGA LUST site are within approximately three miles of the target property (KTA 2021). **Table 6-5** presents the FRS interests that were identified within the Study Area and Project Area as a result of this review. Most of the FRS interests that were identified are related to oil and gas production facilities in the Study Area and Project Area (e.g., gas plants, compressor stations) that are captured under multiple FRS categories (**Table 6-5**). Other facilities were identified in the FRS records that are not related to oil and gas production such as the Jahner Sanitation Landfill and Rohweder Dairy. No Superfund sites were identified within the Study Area or Project Area.

Table 6-5: U.S. Environmental Protection Agency Facility Registry Service Interests in the Study Area and Project Area

EPA FRS Interest Category	Study Area	Project Area
Department of Homeland Security—Chemical Security Assessment Tool Reporter	0	0
Enforcement/Compliance Activity	0	0
Risk Management Plan Reporter	1	0
Small-quantity Hazardous Materials Generator	0	0
State Master	12	2
Tier 2 Hazardous Materials Reporter	0	0
Toxic Substances Control Act Reporting	0	0
Not Currently Classified in any Hazardous Waste Universe	0	0
Air Major	2	0
Total	15	2

Source: (EPA 2021)

The Phase I Environmental Site Assessment conducted for the Project Area (KTA 2021) identified three recognized environmental conditions (RECs). These RECs have been avoided for turbine locations and all associated infrastructure.

6.4.1.4. Security

The Study Area and Project Area are in generally rural areas. The Project Area is located to the west of the City of Wishek. No cities or towns are located within the boundaries of the Study Area or Project Area.

6.4.2. Human Health and Safety Impacts and Avoidance/Minimization Measures

6.4.2.1. Air Traffic

Badger Wind has coordinated with the FAA, the Department of Defense (DoD) Siting Clearing House, Wishek Municipal Airport, and the North Dakota Aeronautics Commission regarding the Project.

Badger Wind conducted a Visual Flight Rules (VFR) Route Traffic Flow Analysis that indicated the Project is not anticipated to negatively affect VFR Routes. VFR are applicable during periods of adverse weather conditions when planes need to fly below the typical floor of controlled airspace. The basis for evaluating the effect of obstructions on operations along these routes is whether pilots would be able to visually observe and avoid obstructions during marginal VFR weather conditions. At least one mile of flight visibility is required for VFR operations beneath the floor of controlled airspace, meaning a surface reference used for VFR low-altitude flight must be horizontally visible to pilots for a minimum of one mile (FAA 2021). Badger Wind confirmed that only 129 flights flew over the Project Area over the course of one year. This is well below the FAA's threshold of significance, which is defined as 365 flights per year (**Appendix D**). Therefore, these results indicate that the Project should not have a negative effect on VFR Routes.

The Project was informally reviewed by the DoD Military Aviation and Installation Assurance Siting Clearinghouse in November 2021, and no concerns were raised (**Appendix D**).

Badger Wind also coordinated with the Wishek Municipal Airport and the North Dakota Aeronautics Commission regarding the proposed project layout. During those discussions, the Wishek Municipal Airport and the North Dakota Aeronautics Commission identified concerns with five potential turbine locations. As a result, Badger Wind removed those locations from further consideration (i.e., those turbines are not included in the project layout proposed in this Application), and the Wishek Municipal Airport and North Dakota Aeronautics Commission indicated that removal of those turbines addressed their concerns.

The FAA requires the submittal of a Notice of Proposed Construction (Form 7460-1) for any object that will extend more than 200 feet AGL. The FAA conducts aeronautical studies to determine whether the structures may be a hazard to air navigation and, if no issues are identified, issues Determinations of No Hazard. Badger Wind has submitted Notice of Proposed Construction (Form 7460-1) filings to the FAA for all turbine and permanent MET tower locations. Badger Wind received preliminary findings from the FAA regarding the locations, which included concerns regarding two of the proposed turbine locations (turbines 33 and 70). Badger Wind is in the process of coordinating with the FAA on minor shifts to those two turbine locations and will update the layout once those turbine adjustments have been finalized.

The FAA publishes Advisory Circulars that define the standards for marking and lighting structures to promote aviation safety. Chapter 13, Marking and Lighting Wind Turbines, in the regulations and policies document Advisory Circular 70/7460-1M, Obstruction Marking and Lighting, provides guidelines to mark and light wind farms (FAA 2020a). Wind turbine lighting will satisfy FAA requirements, as mentioned in **Section 4.1.1.5**. The permanent MET towers will be marked

and lighted as specified by the FAA. Additionally, the Project's permanent MET towers will comply with applicable state marking requirements (see NDCC Chapter 2-05).

The Project will comply with the light-mitigating technology system requirements set forth in NDCC Section 49-22-16.4. Subject to FAA approval, Badger Wind plans to use an ADLS. ADLS is a sensor-based system designed to detect aircraft as they approach an obstruction or group of obstructions. The system will automatically activate the appropriate obstruction lights until they are no longer needed by the aircraft (e.g., the aircraft clears the area). The ADLS structure will be freestanding.

If the permanent MET towers have guy wires, bird diverters will be installed. The permanent MET towers will not exceed 101 meters in height to allow a lighting protection system to extend above the upper-level sensor. The existing temporary MET towers will be removed shortly before construction commencement, depending on the construction schedule.

There are no ICBM sites in Logan or McIntosh counties.

6.4.2.2. Electromagnetic Fields

Levels of EMF from the Project will be considerably below accepted guidelines. Project-specific EMF levels were not modeled for the 34.5 kV electrical collection lines; however, several studies have documented EMF exposure levels for various higher voltage transmission lines.

The National Institute of Environmental Health Sciences (NIEHS) provides typical EMF levels for power transmission lines (NIEHS 2002). For 115-kV transmission lines, the lowest voltage with typical EMF levels reported in the study, electric fields directly below the transmission line were reported at 1.0 kV/m before dissipating to 0.5 kV/m at 50 feet (the approximate edge of ROW). A Canadian study of collection lines at a wind facility measured EMF (magnetic fields) of the Project's 27.5-kV collection lines, a slightly lower voltage than the electrical collection lines proposed for the Project. This study found magnetic fields associated with buried electrical collection lines to be within background levels at one meter AGL (McCallum et al. 2014). EMF from underground electrical collection lines dissipates very close to the lines because they are installed below ground within insulated shielding. The electrical fields are negligible, and the small magnetic field directly above the lines dissipates within 20 feet on either side of the installed cable, based on engineering analysis.

Research has been conducted on the potential influence of EMF on organisms and human health to understand the basic interactions of EMF with biological organisms and cells, and to investigate potential therapeutic applications. Over the past 40 years, considerable additional research has been conducted to address uncertainties in those studies and to determine whether there was any consistent pattern of results from humans, animals, and cells that would support such an association.⁶ The large number of research studies conducted to date has led scientific

⁶ The NIEHS assembled a 30-person Working Group to review the cumulative body of epidemiologic and experimental data and provide conclusions and recommendations to the U.S. government (Boorman et al. 1999). The International Agency for Research on Cancer completed a full carcinogenic evaluation of EMF in 2002 (WHO

and government health agencies to assemble multidisciplinary panels of scientists to conduct weight-of-evidence reviews and arrive at conclusions about the possible effects associated with EMFs. Overall, the published conclusions of these scientific review panels have been consistent. None of the panels concluded that either electric fields or magnetic fields are a known or likely cause of any adverse health effect at the long-term, low-exposure levels found in the environment. As a result, no standards or guidelines have been recommended to prevent this type of exposure. Thus, no impacts due to EMF are anticipated, and no mitigation specific to EMF is proposed.

6.4.2.3. Hazardous Materials / Hazardous Waste

Badger Wind does not anticipate that hazardous waste sites will be encountered within the Project Area during construction. As noted above, the Project has been sited to avoid RECs identified in the Phase I Environmental Site Assessment. If hazardous waste sites are encountered during construction, Badger Wind will contact the NDDEQ to determine appropriate next steps.

Badger Wind will obtain coverage under a North Dakota Pollutant Discharge Elimination System (NDPDES) General Construction Permit for the Project, which will require Badger Wind to develop a Storm Water Pollution Prevention Plan (SWPPP). Additionally, hazardous materials used for construction or operation of the Project will be stored according to applicable regulations.

On-site storage of turbine petroleum products in the O&M facility will be minimal, and these materials will be stored aboveground. If oil storage will exceed 1,320 gallons, Badger Wind will prepare a Spill Prevention, Control, and Countermeasures (SPCC) Plan for the Project. Any spills that occur will be immediately controlled and cleaned up in accordance with the SPCC plan.

Badger Wind will engage contractors who demonstrate a strong safety culture, including management commitment and engagement, safe work policies and programs, employee involvement, and historic safe work performance indicators. Contractors will be required to implement safe work requirements meeting or exceeding Occupational Safety and Health Administration requirements, applicable permits, equipment manufacture and technical work instructions, and any other prudent safety practices, methods, and/or standards generally engaged in, or observed by, the majority of construction contractors for similar work. Contractors are expected to exercise reasonable judgment and implement work consistent with applicable regulations and permits to achieve an accident- and injury-free workplace.

6.4.2.4. Security

Badger Wind does not anticipate that construction and operation of the Project will impact the security of surrounding residents or communities. An on-site O&M manual and health and safety training plan for the Project, including contacts, education and training materials, action plans, and procedures to reduce the potential for safety and security issues will be developed. As

2002). The International Commission on Non-Ionizing Radiation Protection (ICNIRP) published a review of the cumulative body of epidemiologic and experimental data on EMF in 2003 and released exposure guidelines in 2010 that updated their 1998 exposure guidelines (ICNIRP 2010).

discussed in **Section 6.3.2.1**, Badger Wind will coordinate with local emergency management offices and other relevant agencies to determine appropriate safety precautions and standards and to develop an Emergency Management Plan. Turbines will be clearly numbered for identification and emergency response, and Badger Wind will provide a map identifying turbine locations and numbers to local emergency response coordinators.

During operation of the Project, all facilities, including turbine access doors, the O&M building, and the gate to the fence surrounding the project substation, will be locked when not in use and will have appropriate warning signage.

6.5. Sound Resources

The following sections describe the existing soundscape, potential impacts, and proposed avoidance and minimization measures.

6.5.1. Existing Conditions

The Project is located in a rural area in south-central North Dakota near the town of Wishek. The existing soundscape within the Project Area is likely to include road traffic, birds, insects, farming machinery, and general farming or recreational activities. Sound levels in rural areas typically range from 35 to 45 decibels (dB) using the A-weighting scale (dBA) at night but can exceed these levels based on temporary activity occurring in localized areas (FAA 2020b).

6.5.2. Sound Impacts and Avoidance/Minimization

Sound generated by wind turbines can be categorized as either aerodynamic sound or mechanical sound. Aerodynamic sound is produced by wind passing over the blades as they rotate, and mechanical sound refers to sound generated by other mechanical components inside or near the nacelle, such as the gearbox, main shaft, generator, yaw motor and, to a lesser extent, electrical systems within the turbine and at the base of the tower. Generally, sound emission levels increase with wind speed until a peak occurs near the knee of the power curve, after which the sound level may remain steady or decrease until cut-out.

Commission rules require that wind turbines be sited such that sound levels within 100 feet of an inhabited residence or community building do not exceed 45 dBA unless a waiver is obtained from the owner of the inhabited residence or community building (see NDAC Section 69-06-08-01(4)). Logan County and McIntosh County do not have sound level requirements for wind energy facilities.

Badger Wind conducted a Sound Assessment (**Appendix E**) for the Project. Sound levels were calculated using the ISO 9613-2 sound propagation model. The sound assessment assumed that: (i) all potential wind turbine locations will be used (i.e., all 79 turbine positions), (ii) the turbines will be operated at a wind speed resulting in the loudest noise possible being emitted, and (iii) a +2 dB uncertainty factor was applied to turbine sound power levels. Additionally, Badger Wind included the two substation step-up transformers in the sound modeling. For purposes of modeling, Badger Wind assumed LNTE blades on all 79 turbines. Badger Wind has not yet

selected the subset of 74 turbines to be constructed or the final turbine model. For purposes of modeling, the GE 3.4-140 turbine model with a hub height of 322 feet (98 meters) was used.

The results of the modeling showed that nine receptors (including six participating and three non-participating residents) exceeded the applicable 45 dBA sound limit. Badger Wind has obtained or is in the process of obtaining waivers for the receptors where the modeled sound level from the Project is above 45 dBA. These sound waivers can be found in **Appendix J**.

6.6. Visual Resources

The following sections describe existing conditions, potential impacts, and proposed minimization and avoidance measures for the visual environment of the Study Area and Project Area, including the potential effects of shadow flicker.

6.6.1. Existing Conditions

6.6.1.1. Aesthetics

The topography of the Project Area is generally flat with elevations ranging from approximately 1,963 to 2,263 feet (598 to 690 m) above sea level. Elevations are lowest along the stream crossing the center of the Project Area and highest in the western portion of the Project Area. The landscape can be classified as rural open space.

Viewsheds in and around the Project Area are generally broad and uninterrupted. Only a few small, scattered areas have obstructed views; the obstructions are trees and buildings. Aside from the City of Wishek, the development is composed primarily of residences and farm buildings scattered along rural county roads, as well as general service infrastructure such as electrical transmission lines, railroads, and communications towers/antennae. Horizontal elements, such as roads and railroads, are consistent with the long and open viewsheds in the area. Vertical elements such as electrical transmission lines and communications towers/antennae are the tallest and often the most visual features on the landscape; some reach 200 feet in height. No visually sensitive areas, such as National Parks, exist in or are directly adjacent to the Study Area.

6.6.1.2. Shadow Flicker

Shadow flicker occurs when the rotating blades of a wind turbine are directly between an observer and the sun, causing alternating light and shadow. Shadow flicker intensity and frequency at a given receptor are determined by a number of interacting factors including sun angle and sun path, turbine and receptor locations, cloud cover and degree of visibility, wind direction, wind speed, obstacles, contrast, and local topography. This effect decreases and ultimately disappears with distance from the turbine and is also eliminated by obstacles between the observer and the turbine, such as trees or terrain. Shadow flicker is predictable, and it can be minimized through turbine site selection. Shadow flicker is harmless to humans, though it may be considered by some to be an annoyance (**Appendix F**).

6.6.2. Visual and Aesthetic Impacts and Avoidance/Minimization Measures

Visual and aesthetic impacts that would result from construction of the proposed Project, as well as proposed avoidance/minimization measures, are discussed below.

6.6.2.1. Aesthetics

Measuring the aesthetic value of a specific landscape is difficult and may vary based on an individual's personal values, experiences, or preferences. The degree of visual contrast will vary based on the viewpoint distance and location in relation to the Project.

The introduction of project facilities has the potential to alter the existing aesthetics where they are most perceptible. During construction, visual impacts associated with the project facilities would include the removal of existing vegetation, if any, and the exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, and machinery and tool storage. These impacts are mostly only noticeable in close proximity to the work areas and are temporary in nature, as the areas would be restored following construction.

During operation, visual impacts associated with the Project include the presence of the wind turbines, movement of the rotor blades, shadow flicker, turbine marker lights, lighting on control buildings, ancillary structures, roads, vehicles, and workers conducting maintenance activities. Generally, turbines will be noticeable from most locations within the Study Area due to the flat topography and absence of tall vegetation, structures, or other landscape features. Visual impacts will vary depending on the viewer's proximity and orientation to the turbines (i.e., within the Project Area vs. outside the Project Area and the direction the viewer faces relative to wind turbines), obstructions such as tree lines, the viewer's duration in the Project Area (i.e., a resident vs. a car passing through the Project Area), and the viewer's personal preferences.

The FAA requires obstruction lighting or marking of structures more than 200 feet AGL to provide safe air navigation; for wind turbines, this lighting is synchronized flashing of red lights. As described in **Section 6.4.2.1**, Badger Wind will coordinate with the FAA on implementation of ADLS, which is consistent with the Commission's light-mitigating technology requirements in NDAC Chapter 69-06-11. Furthermore, Badger Wind's layout complies with the Commission's minimum setback of three times tip height between turbines and non-participating inhabited residences, thereby distancing turbines from non-participating residences.

Additionally, wind turbines will exhibit visual cohesion in the shape, color, and size of rotor blades, nacelles, and towers. Collection lines on the site will be buried. For ancillary buildings and other structures, low-profile structures will be chosen whenever possible to reduce their visibility. Turbine foundations and roads have been designed to minimize and balance cuts and fills.

6.6.2.2. Shadow Flicker

No local, state, or federal requirements exist with respect to shadow flicker. However, Badger Wind has designed the Project to comply with the industry standard of 30 hours per year or less of shadow flicker at non-participating and participating occupied residences, absent a waiver. A

shadow flicker analysis was completed for all occupied residences (40 receptors) within ten times tip height (5,512 feet) using WindFarmer Analyst software. This distance was chosen because the shadow, at this distance, is sufficiently diffused. All 79 wind turbine locations were modeled, even though not all 79 turbine positions will be constructed.

The duration of shadow flicker experienced at a specific location can be determined using a purely geometric analysis that takes into account the relative positions of the sun throughout the year, the locations and dimensions of the wind turbines, and the location of the receptor. Additionally, the site-specific cloud coverage and wind direction statistics have been incorporated into the calculation. No other physical obstructions were modeled. Using this realistic (expected case) method, shadow flicker was modeled at the identified receptors (see **Appendix F**). The results of the analysis show that the highest expected shadow flicker at a participating receptor is 38 hours per year. All other receptors, including all non-participating receptors, have less than 30 hours per year of expected shadow flicker.

Receptors that experience shadow flicker will typically only experience it when the sun is low in the sky, and when certain meteorological and operational factors are present. If a receptor does experience shadow flicker, it most likely will be only during a few days per year from a given turbine, and for a total of only a fraction (typically less than one percent) of annual daylight hours. Badger Wind has sited turbines to minimize impacts to residences.

6.7. Cultural and Archaeological Resources

The Project has followed North Dakota guidelines for cultural (archaeological and architectural) assessment per the North Dakota State Historic Preservation Office (ND SHPO) and the State Historical Society of North Dakota (SHSND). Badger Wind has conducted a Class I archaeological literature search, Class I architectural literature review, Class II architectural and reconnaissance inventory, and Class III cultural resources inventory for the Project. Badger Wind had a meeting with the SHSND on 21 September 2021 to discuss the results and status of the architectural and archaeological assessments. Coordination with the SHSND is ongoing. The following sections describe existing known cultural and archaeological resources, potential impacts, and proposed avoidance and minimization measures.

Badger Wind engaged the SHSND during informal consultation in 2020. Badger Wind discussed moving forward with a Class I archaeological literature search and a Class III pedestrian archaeological survey; these efforts are discussed in **Section 6.7.1.1**. At the time of the meeting, SHSND also suggested that a Class II architectural windshield survey should be completed; this survey is discussed in **Section 6.7.1.2**.

At the time of the meeting with the SHSND and during the survey of archaeological and architectural history resources, the proposed Project Area (cultural resources Project Area [CR Project Area]) was larger than the current Project Area.

6.7.1. Existing Conditions

6.7.1.1. Archaeological Resources

A Class I archaeological literature search was completed for the CR Project Area plus a one-mile buffer in October 2020. The Class I archaeological literature search was completed through a review of the North Dakota Cultural Resources Survey data files maintained by the SHSND. The National Register of Historic Places (NRHP) database was also reviewed. The area of potential effects (APE) for the Project Area was defined in accordance with the ND SHPO Guidelines as a one-mile radius surrounding the proposed project infrastructure (e.g., turbines, electrical collection lines, substation). The Class I archaeological literature search identified 40 previously recorded archaeological resources within the CR Project Area and one-mile buffer.

A Class III cultural resources inventory was completed for the proposed Project in October and November 2020 and September and October 2021. In total, approximately 1,948 acres were surveyed. The methods for the Class III inventory followed the ND SHPO Guidelines Manual for Cultural Resource Inventory Projects (SHSND 2020). The Class III cultural resources inventory identified eight historic archaeological sites, two isolated finds, and two site leads within the CR Project Area. Of the resources identified, only one remains unevaluated and is recommended for avoidance (this site is within the current Project Area); the remaining resources are recommended not eligible for NRHP listing. To accommodate landowner requests and due to micrositeing, small portions of the project layout will need to be surveyed for cultural resources in the spring of 2022. Badger Wind will update the Commission on the timing and results of these survey efforts.

6.7.1.2. Architectural Resources

A Class I literature review and Class II architectural reconnaissance inventory survey were completed for the Project in September and October 2021. The APE was defined in accordance with the ND SHPO Guidelines as a two-mile radius surrounding the proposed turbine locations. At the time the survey was conducted, Badger Wind was considering multiple turbine options within the larger CR Project Area. As a result, the APE covered a larger survey area than would be required for the current project layout. The purpose of the survey was to identify and document all historic architectural resources (aboveground resources 45 years of age or older) located within the APE; to evaluate their eligibility for listing in the NRHP; to recommend site boundaries, if eligible; and to evaluate the effects of the Project on any properties listed in, or eligible for listing in, the NRHP.

The Class I literature review identified 23 previously documented historic aboveground resources within the APE.

During the Class II architectural reconnaissance inventory field survey, 578 architectural resources were identified within the APE, 17 of which had been previously documented. The remaining six previously documented resources identified in the literature review were determined to be no longer extant. Following receipt of input from the SHSND, 13 sites were identified as warranting a detailed evaluation to assess potential eligibility for listing in the NRHP.

A full evaluation of these sites indicated that six resources are recommended eligible for NRHP listing. None of the evaluated resources are located with the current Project Area.

The SHSND reviewed the Class II architectural inventory report and requested modifications and further evaluation of two sites (which were included in the 13 sites discussed above). Badger Wind's consultant is in the process of completing the requested report revisions, and the updated report will be provided to the SHSND and the Commission upon completion.

6.7.2. Cultural Resources Impacts and Avoidance/Minimization Measures

Ground-disturbing activities during construction of the Project have the potential to impact known or unknown cultural resources. Because the Project involves the construction and operation of wind turbines, if historic architectural resources are present in or adjacent to the Project Area, the presence of wind turbines could affect the visual setting of these resources.

As designed, the project layout avoids impacts to the one unevaluated archeological resource identified. As a result, no impacts to archaeological resources are anticipated. Additionally, Badger Wind has developed an Unanticipated Discoveries Plan, which will be followed during construction in the event that potential cultural resources or human remains are encountered. A copy of the Unanticipated Discoveries Plan will be included as an appendix to the Class III cultural resource inventory report. Atwell is in the process of finalizing the Class III cultural resource inventory report, and a copy of the finalized report will be provided to the SHSND and the Commission upon completion.

One historic architecture resource potentially eligible for the NRHP is located within the Project Area; however, the Project will not directly impact this resource. Additionally, the Project is not anticipated to have an adverse indirect impact on this resource. The visual setting of this resource already includes modern infrastructure such as transmission lines and oil and gas production facilities; therefore, the wind turbines associated with the current Project will not intrude upon the resource's immediate setting or diminish any qualities that make it eligible for the NRHP. The qualities of the property that warrants its listing in the NRHP will not be diminished.

Badger Wind continues to coordinate with the SHSND on archaeological and architectural resources. As noted above, Badger Wind will provide both the SHSND and the Commission with copies of the finalized Class II and Class III reports and will provide the Commission with the SHSND's concurrences on the finalized reports once they are received. Additionally, Badger Wind will complete cultural resources surveys on a minimal number of unsurveyed areas, will report the findings to the SHSND, and will obtain and provide the Commission with the SHSND's concurrence prior to constructing in those areas.

6.8. Recreational Resources

The following sections describe existing recreational resources in the Study Area and Project Area, potential impacts, and proposed avoidance and minimization measures.

6.8.1. Existing Conditions

There are no designated recreation areas, public or private parks, or designated trails located in the Project Area or Study Area.

6.8.2. Recreational Resources Impacts and Avoidance/Minimization Measures

Because there are no designated recreation areas, public or private parks, or designated trails located in the Project Area, the Project will not impact recreational resources.

6.9. Effects on Land-Based Economies

The following sections describe existing conditions, potential impacts, and proposed mitigation for agriculture and woodlands.

6.9.1. Existing Conditions

The following sections describe existing agriculture and woodlands in the Study Area and Project Area.

6.9.1.1. Agriculture

The Project is located in south-central North Dakota, in a predominantly rural agricultural region in Logan and McIntosh Counties. According to USDA data for 2021, 351 farms are operating in Logan County with an average farm size of 1,800 acres, and 363 farms are operating in McIntosh County with an average farm size of 1,343 acres. In Logan County, livestock accounts for a larger percentage of total market value of agricultural products sold annually compared to crop sales, at USD 100M vs. USD 55M, respectively. In McIntosh County, crop sales accounts for a larger percentage of total market value of agricultural products sold annually compared to livestock, at USD 53M vs. USD 41M, respectively. In both Logan and McIntosh Counties, the dominant agricultural crop by acreage is soybeans, and the dominant livestock by number of head is cattle. Prime farmland within the Project Area is discussed in **Section 6.10**.

6.9.1.2. Woodlands

As noted in **Table 6-2**, areas classified as Planted Woodland, Riparian Woodland, and Wooded Draw/Ravine Woodland comprise approximately 719.9 acres and 185.1 acres within the Study Area and Project Area, respectively. Approximately 0.5 percent of the Study Area and Project Area fall into these categories. Trees are sparse within the Project Area and are not utilized for economic activities associated with woodlands, such as logging or timber trading. Shelterbelts, which are composed of planted trees or shrubs aligned in rows along the perimeter of crops or near farmsteads, are found within the Project Area. Shelterbelts provide wind protection to croplands or buildings. Other woodlands in the Project Area are adjacent to creeks and other water sources.

Badger Wind conducted a detailed analysis of satellite imagery to delineate woodland areas on a finer scale, including wooden stands, shelterbelts, and tree lines. Based on this detailed assessment, approximately 62.4 acres of woodland are in the Project Area. The Project will result

in 0.03 acres of impacts to these delineated woodlands, which are related to access road and turning radius construction workspaces. If impacts do occur, they will be minimal and mitigated by implementing the Project Tree and Shrub Mitigation Plan

6.9.2. Land Based Economies Impacts and Avoidance/Minimization Measures

The following sections describe impacts to agriculture and woodlands and proposed mitigation.

6.9.2.1. Agriculture

Construction of the Project could cause minimal, temporary impacts to agricultural land from soil compaction and rutting, accelerated soil erosion, crop damage, temporary disruption to normal farming activities, and introduction of noxious weeds to the soil surface. However, the Project will repair and restore temporary impacts and will have minimal impact on use of land for agricultural production. As demonstrated by other wind energy projects in North Dakota, agricultural practices will be able to continue during project construction and operations.

Although up to 975.46 acres of agricultural land will be temporarily impacted during construction, these areas will be available for agricultural use following construction. Agricultural land temporarily impacted by construction will be restored to pre-construction conditions in accordance with NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission, as detailed in **Appendix I**. Temporary impacts to soil will be restored (e.g., decompacted) in accordance with Commission requirements and landowner agreements.

The Project will impact up to 69.49 acres of agricultural land for the life of the Project. However, during operations, landowners may continue to plant crops and graze livestock near and up to the turbine pads and access roads.

Row crop production and livestock grazing within the footprint of access roads would be impacted for the life of the Project. However, access roads are designed in such a way that they do not unnecessarily impede agricultural use beyond the footprint of the access road. This allows for continued farming in the area around the access road. Additionally, Badger Wind has reviewed the layout with landowners and sited the access roads in consultation with landowners. The access roads have been located to reserve space for agricultural equipment to maneuver during operations and to avoid unnecessarily impeding agricultural uses while still providing access to project infrastructure. The substation, O&M facility, permanent MET towers, and ADLS tower would be fenced, but agricultural production and livestock grazing would be allowed to continue beyond the fenced area.

The loss of agricultural land for operation of the Project will reduce the amount of land that can be cultivated or grazed in the Project Area; however, less than one percent of the Project Area will be converted to non-agricultural land use (i.e., wind turbines, access roads, substation, O&M facility, permanent MET towers, and ADLS tower) for the life of the Project. This represents minimal impact to agricultural land in the Project Area and will not significantly alter agricultural production in the Project Area or Logan and McIntosh Counties. Furthermore, the Project will

allow landowners to diversify their operations with an additional, steady income source. This additional income would also be reflected as an increase to the county tax bases. Additional money brought into the community would likely result in increased spending at local businesses and improvements to the communities and counties.

6.9.2.2. Woodlands

Trees are sparse within the Project Area, and Badger Wind has designed the Project to minimize tree removal to the extent possible. Badger Wind has sited the majority of project facilities in areas lacking large contiguous woodlands. If tree removal is necessary, Badger Wind will coordinate with landowners regarding tree removal and replacement and will follow the Commission's tree and shrub mitigation specifications. If necessary, Badger Wind may bore collection lines under tree lines and woodlots to avoid impacts.

Construction of the Project will impact up to 0.03 acres of woodlands, which are related to access road and turning radius construction workspaces. Any impacts on trees and woodlands from the placement of wind turbines and associated facilities for the Project would be minor in nature. If impacts are to occur, they will be minimal and mitigated by implementing the Project Tree and Shrub Mitigation Plan.

6.10. Soil Resources

The following sections describe the existing soil conditions within the Study Area and Project Area, potential impacts, and proposed avoidance and minimization measures.

6.10.1. Existing Conditions

Soil characteristics within the Study Area and Project Area were assessed using the NRCS Soil Survey Geographic (SSURGO) database. The SSURGO database provides a description of the soils present and information about their unique properties and productivity (USDA 2019). In all, 112 soil types are found within the Study Area and 97 soil types are within the Project Area. A list of the soil types is provided in **Appendix G**. The dominant soil map units found within the Study Area and the Project Area are classified as silt loams or silty clay loams and range from moderately well drained to poorly drained (USDA 2019).

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for the production of food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pasture, woodland, or other lands) (NRCS 2021). Urbanized land and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating). Approximately 5.1 percent of the Study Area is classified as prime farmland, and less than 0.1 percent is classified as prime farmland if drained (**Table 6-6**). Prime farmland covers approximately 5.5 percent of the Project Area, and less than 0.1 percent is covered by prime farmland if drained.

Table 6-6: Farmland Classifications within the Study Area and Project Area

Farmland Classification	Study Area (acres)*	Percentage of Study Area*	Project Area (acres)*	Percentage of Project Area*
Prime Farmland	6,368.7	5.1	1,743.0	5.5
Farmland of Statewide Importance	40,505.0	32.2	8,045.5	25.5
Not Prime Farmland	79,015.3	62.7	21,718.4	68.9
Prime Farmland If Drained	65.1	0.1	6.9	0.0
Total	125,954.2	100.0	31,513.8	100.0

Source: (USDA 2019)

*Note: Rounding has been applied to all values.

The NRCS also inventories farmland of statewide importance. The criteria for these areas are determined by state agencies; generally, farmland of statewide importance includes areas that nearly meet the requirements for prime farmland and could produce high yields of crops if managed appropriately. Farmland of statewide importance can also include parcels that have been designated for agriculture by state law. Farmland of statewide importance is mapped across 32.2 percent of the Study Area and 25.5 percent of the Project Area.

Table 6-6 lists the acres of prime farmland, prime farmland if drained, and farmland of statewide importance within the Study Area and the Project Area. **Figure 9: Prime and Unique Farmland** depicts the distribution of these classifications within the Study Area and the Project Area.

6.10.2. Soil Resources Impacts and Avoidance/Minimization Measures

Surface disturbance caused by construction of the wind turbines and associated infrastructure would result in the soil surface becoming more prone to erosion. The use of heavy equipment during construction could result in soil compaction. However, any such impacts to soils within the Project Area will be localized to the areas where project activities occur and BMPs will be implemented to minimize these impacts. These BMPs may include the use of erosion and sediment control during and after construction, noxious weed control, segregating topsoil from subsurface materials in accordance with Commission requirements, decompaction of subsurface soils before topsoil replacement, reseeding of temporarily disturbed areas, the use of construction equipment appropriately sized to the scope and scale of the Project, and designing access road grades to fit closely with the natural terrain, to the extent practicable. Soil cuttings will be disposed of on site in accordance with applicable federal, state, and local requirements (see **Appendix I**). Additionally, Badger Wind will use silt fencing in areas under construction, as needed, to control erosion and storm water runoff. Surface flows will be directed away from cut-and-fill slopes and into ditches that discharge into natural drainages. Badger Wind will conduct regular inspection and maintenance of roads, turbine pads, and trenched areas to minimize erosion.

Less than 0.5 percent of the total land in the Project Area that could be considered prime farmland or farmland of statewide importance will be impacted for the life of the Project. Within the Project Area, 7.24 acres of prime farmland and 40.39 acres of farmland of statewide

importance would be impacted for the life of the Project (**Table 6-7**). As such, the acres of prime farmland and farmland of statewide importance removed from use for the life of the Project will have a negligible impact on agricultural production.

Table 6-7: Summary of Permanent Impacts to Prime Farmland

Farmland Classification	Permanent Facility Acres ¹
Prime Farmland ²	7.24
Farmland of Statewide Importance	40.39
Not Prime Farmland	44.64
Total	92.28

¹ Acres of impacts includes all permanent facilities (turbines, access roads, project substation, and O&M facility). Rounding has been applied to all values.

² This includes soils classified as prime farmland or prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating).

Following construction, the temporarily disturbed areas outside of cropland will be reclaimed and reseeded with a seed mixture consistent with the surrounding vegetation and free of noxious weeds according to NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission (see **Appendix I**). To minimize the impacts of surface water runoff, BMPs in accordance with a SWPPP will be implemented, including use of silt fencing to control erosion and storm water runoff and directing surface flow away from cut-and-fill slopes and into ditches that discharge to natural drainages. All roads, turbine pads, and trenched areas will be regularly inspected and maintained to minimize erosion. Additionally, Badger Wind will obtain coverage under the NDPDES General Stormwater Construction Permit, which requires preparation of a SWPPP. In addition, if more than 1,320 gallons of oil storage occurs on-site during construction, Badger Wind will complete and implement a SPCC Plan.

6.11. Geologic and Groundwater Resources

The following sections describe existing geologic and groundwater resources, potential impacts, and proposed mitigation measures. **Figure 10: Geologic and Groundwater Resources** depicts the existing geologic and groundwater resources in the Study and Project Areas.

6.11.1. Existing Conditions

The Study Area is located in a region of North Dakota known as the Missouri Coteau Slope (an area of Wisconsin glacial till over Tertiary sandstone and shale) and Cretaceous Pierre Shale. The topography of the area consists of level to gently rolling plains that slope to the Missouri River (Bryce et al. 1996). Surface geology within the Study Area is predominately composed of two formations: Fox Hills and Pierre, which are characterized by thin glacial deposits and outwash consisting of sand and gravel between zero and 50 feet thick and underlying bedrock composed of shale (Clayton 1962; Bluemle 1983; Bluemle 1988).

The geology of south-central North Dakota, including Logan and McIntosh Counties, is not known for oil and gas development, and most oil and gas operations are located in western North Dakota (ND DWR 2021b). According to the Phase I Environmental Site Assessment completed for the

Project, no storage tanks associated with oil and gas activities are within the Project Area and one gas well listed as a dry gas well (i.e., natural gas in the absence of condensate or liquid hydrocarbons) is located approximately two to three miles from the Project Area (KTA 2021). The status of this well is also listed as having a canceled permit, and therefore it is unlikely that this is an active well. A review of the ND DWR oil wells layer indicates that ten dry oil and gas wells are within the Study Area; two of these are within the Project Area. No active oil and gas wells were identified (**Figure 8: Existing Infrastructure**) (ND DWR 2021b).

Groundwater resources in the area occur approximately 50 feet below ground surface (KTA 2021). According to the publicly available North Dakota GIS database and North Dakota GIS Hydrography layer, several aquifers are in Logan and McIntosh Counties, two of which are located in the Project Area: the Wishek and Lower Wishek aquifers. The Wishek and Lower Wishek aquifers cover an area of about 17,920 acres in Logan and McIntosh Counties (ND GIS 2021). In all, 45 domestic/stock/industrial/observational water wells are in the Study Area; of these 45 wells, 15 are located within the Project Area. Six of these wells are for stock ponds, four are associated with farmsteads, two are associated with active observation wells, and three are either capped or destroyed observation wells. Within the Study Area, 26 wells are listed as test wells and four are listed as unknown, of which four test wells and two unknown wells are within the Project Area.

6.11.2. Geologic and Groundwater Impacts and Avoidance/Minimization Measures

Badger Wind does not anticipate any impacts to bedrock during construction or operation of the Project because bedrock within the Project Area is at depths much greater than the proposed foundation depths of seven to 13 feet deep. Additionally, Badger Wind does not expect any impacts to groundwater resources because the Wishek and Lower Wishek aquifers are at depths greater than the underground collection line depths of approximately four feet and proposed foundation depths of seven to 13 feet deep. Additionally, project facilities have been sited to avoid water wells.

Badger Wind anticipates that water may be used during construction for dust control and concrete mixes at a temporary concrete batch plant, if one is needed to supply concrete for construction of the Project. The water source will be determined prior to construction.

The O&M facility will likely require a new private water well. Water usage during the operating period will be similar to household volume—less than five gallons per minute. Use of water for operations will be negligible. The Project will not require the appropriation of surface water or permanent dewatering.

Badger Wind has voluntarily sited turbines 168 meters (approximately 551 feet) (turbine tip height) away from existing inactive oil and gas wells in the Project Area; no active oil and gas wells were identified within the Project Area.

6.12. Surface Water and Floodplain Resources

The following sections describe existing surface water and floodplain resources in the Study Area and Project Area, potential impacts, and proposed avoidance/minimization measures. **Figure 11: Surface Water and Wetlands**, depicts the existing water resources in the Study and Project Areas.

6.12.1. Existing Conditions

The Study Area is adjacent to the West Missouri Coteau Watershed. The West Missouri Coteau subbasin occupies 1,287,800 acres in Dickey, Logan, and McIntosh Counties in North Dakota as well as four additional counties in South Dakota. This watershed is located in the Great Plains Physiographic Province, which has gently rolling to steep topography, characteristic of a hummocky glacial terrain. The drainage pattern in this watershed is poorly defined and characterized by many closed depressions and potholes (NRCS 2009). The Project Area contains a number of creeks, streams, and wetlands (**Figure 11: Surface Water and Wetlands**), which are covered in greater detail in **Section 6.13**.

Logan and McIntosh Counties have not been mapped by the Federal Emergency Management Agency (FEMA); as such, 100-year floodplains have not been delineated in either county (FEMA 2021).

6.12.2. Surface Water and Floodplain Resources Impacts and Avoidance / Minimization Measures

The Project and associated facilities have been sited to avoid or minimize impacts to surface waters and floodplain resources, to the extent practicable. Wind turbines will be built on uplands to avoid surface water resources in lower elevations, to the extent practicable. Access roads, crane paths, and collection lines have been designed to minimize crossing of streams and other surface waters, to the extent practicable. As currently sited, collection lines intersect two perennial watercourses that were delineated during field surveys in 2020 and 2021. However, collection lines will be bored under these watercourses, thereby avoiding impacts.

Construction of project facilities (such as underground electrical collection lines, access roads, crane paths, turbine pads, project substation, and O&M facility) will impact land, and therefore could potentially impact surface water runoff within the Project Area. Ground-disturbing construction activities also have the potential to cause sedimentation, but these impacts are expected to be minimal and would only occur during construction. These impacts will be minimized through use of BMPs. Badger Wind is coordinating with the USACE Omaha District, North Dakota Regulatory Office in Bismarck, as part of pre-construction due diligence. In a January 2021 letter, the USACE indicated that a Section 404 Clean Water Act (CWA, Act) permit will be needed if discharge of dredge or fill material (temporarily or permanently) into waters of the United States (WOTUS) will occur (**Appendix D**). Badger Wind anticipates that if there would be unavoidable impacts to USACE jurisdictional waters, these activities would be permitted under the Nationwide Permit program.

The Project will also comply with EPA regulations regarding storm water runoff, including the creation of a SWPPP. The SWPPP will address the construction-related temporary measures and permanent restoration methods to slow storm water runoff and avoid sediment reaching streams and rivers. Badger Wind will also implement appropriate erosion and sediment control BMPs. Additionally, Badger Wind will obtain coverage under the NDPDES General Stormwater Permit, which requires preparation of a SWPPP. In addition, SPCC Plans will be implemented for the construction and operation phases of the Project. As such, impacts to surface waters from stormwater discharges are not anticipated from the Project.

No FEMA-mapped floodplains are present in the Study Area as confirmed by the Department of Water Resources; thus, no impacts to FEMA-mapped floodplains are anticipated.

6.13. Wetlands and Waterways

The following sections describe the existing wetlands within the Study Area and the Project Area, potential impacts, and proposed mitigation.

6.13.1. Existing Conditions

Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated much of the year). Wetland types include marshes, swamps, bogs, and fens. Wetlands vary widely due to differences in soils, topography, climate, hydrology, water chemistry, vegetation, and other factors.

The CWA of 1972 (33 U.S. Code [USC] § 1251 et seq.) establishes federal jurisdiction over “navigable waters,” defined in the CWA as “waters of the United States” or WOTUS. Generally, wetlands that have a significant nexus to a navigable water fall within the jurisdiction of the U.S. Army Corps of Engineers (USACE), which administers Section 404 of the CWA. However, both USACE-jurisdictional and non-jurisdictional wetlands have been considered in this analysis. WOTUS may also include non-wetland features such as streams that have a significant nexus to a navigable water (refer to **Section 6.12**).

As discussed further in **Section 6.14**, the Study Area is primarily situated in the Missouri Coteau Slope Level IV Ecoregion of North Dakota. The northwestern portion of the Study Area also intersects the Missouri Coteau ecoregion. The Missouri Coteau Slope Region supports well-developed drainages and has fewer prairie potholes (depressional wetlands formed by glacial activity) in comparison to the Missouri Coteau ecoregion. Unnamed tributaries to South Branch Beaver Creek and Beaver Creek cross the Study Area. Most wetlands within the Missouri Coteau Slope ecoregion (northwestern portion of the Project Area and Study Area) are USACE-jurisdictional due to their connection to these intermittent waterways.

Wetlands in the northeastern portion of the Study Area include wetlands associated with prairie potholes. Both ecoregions naturally support very few forested areas; as a result, wetlands within the Study Area are predominantly emergent. Wetlands in agricultural settings within the Study Area may exhibit anthropological disturbance, particularly ditching and draining to support row crops.

The USFWS National Wetlands Inventory (NWI) is a publicly available dataset of wetlands and waterways generated by aerial imagery analysis (USFWS 2020a). Potential wetlands within the Study Area and Project Area were identified using the NWI. NWI data indicated the potential presence of up to 5,151 acres of wetlands within the Study Area and 1,374 acres of wetlands within the Project Area.

In addition, field wetland delineations were completed at locations within the Project Area with the potential for ground disturbance from project activities. Field wetland delineations were performed between late August and early September 2020, and again between late September and early November 2021. Wetlands were delineated within a survey corridor that included any ground surface area that has the potential to be disturbed by any construction activities or installed facilities associated with the Project. During these surveys, approximately 313.4 acres of wetlands were delineated, of which approximately 268.2 acres fall within the current Project Area. While the majority of areas of potential ground disturbance have been surveyed to date, changes to the proposed project layout were made following feedback from the FAA and to accommodate landowners. As such, limited additional field delineations will be conducted in spring 2022 to delineate wetlands in these areas.

Figure 11: Surface Water and Wetlands shows the locations of delineated wetlands. In areas where field delineations have not yet occurred, wetlands are shown based on NWI data.

6.13.2. Wetlands Impacts and Avoidance/Minimization Measures

The Project has been designed to avoid permanent impacts to delineated wetlands and minimize temporary wetland impacts. Turbines and permanent MET towers will be constructed on higher ground within the Project Area to maximize the wind resource, and as such, will not permanently impact wetlands. Additionally, the preliminary design of the O&M facility, project substation, and ADLS tower are also designed to avoid permanent impacts to delineated wetlands. One access road will cross a field-delineated drainage wetland that parallels an existing road. Badger Wind has sited this access road in the location of an existing farm road to further minimize impacts to this wetland, resulting in a permanent impact to this wetland of less than 0.01 acre. A culvert will be installed where this access road crosses a drainage to facilitate continued wetland function and local hydrology. This impact will be self-certification under the Nation-Wide Permit in accordance with Section 404 of the CWA.

Badger Wind plans to bore to install underground collection only when wetlands are present, thereby avoiding impacts to wetlands. In areas that will be field delineated in spring 2022, Badger Wind plans to re-route crane paths and access roads to avoid delineated wetlands, where feasible. Additionally, the construction workspace of crane paths, access roads, and turbine pads may be reduced in size or slightly shifted, where practicable, to avoid or minimize temporary impacts to wetlands. Matting will also be used in wetlands during construction to minimize temporary disturbances.

Badger Wind is coordinating with the USACE Omaha District, North Dakota Regulatory Office in Bismarck, as part of pre-construction due diligence. In a January 2021 letter, the USACE indicated that a Section 404 CWA permit will be needed if discharge of dredge or fill material (temporarily

or permanently) into WOTUS will occur (**Appendix D**). Badger Wind anticipates that if there would be unavoidable impacts to USACE jurisdictional waters, these activities would be self-certified under the Nationwide Permit program.

6.14. Vegetation Resources

The following sections describe existing vegetation, potential impacts to vegetation, and proposed compensatory mitigation for these impacts.

6.14.1. Existing Conditions

The Project Area is located in both the Missouri Coteau Slope and the Missouri Coteau Level IV Ecoregions within the Northwestern Great Plains Level III Ecoregion of North Dakota (Bryce et al. 1996). The Missouri Coteau is characterized by rolling hummocks that contain numerous wetland potholes. The Missouri Coteau Slope ecoregion is characterized by rolling to hilly plains with more watercourses and fewer prairie potholes. Pre-human development, mixed-grass prairie was the most common grassland in these regions, with very little upland deciduous forest. Land use in these regions is a mixture of agriculture and cattle grazing, which has resulted in conversion of much of the mixed-grass prairie.

Existing vegetation in the Study Area and Project Area is characterized using LANDFIRE's EVT dataset (USGS 2020). Some cover types were grouped into appropriate broader categories to define the land cover types within the Study Area and the Project Area, as summarized in **Table 6-2**.

The Study Area is primarily cropland (57.6 percent). Mixed-grass prairie and planted grassland combined comprise approximately 28.5 percent of the Study Area. These two cover types are interspersed with each other and concentrated in the northeast portion of the Study Area. Similarly, the Project Area is also dominated by cropland (39.4 percent), mixed-grass prairie (29.2 percent), and planted grasslands (14.7 percent) (**Table 6-2** and **Figure 6: Land Cover and Land Use**).

Cropland within the Project Area primarily consists of row crops and wheat. Mixed-grass prairie within the Project Area is characterized by a predominance of native grasses with a mixture of numerous and moderately abundant native forbs (Shiflet 1994). Mixed-grass prairie is often used as pasture or rangeland. Areas that are overgrazed or have experienced extended surface disturbance may support non-native, invasive herbaceous species. Planted grasslands primarily comprise lands that were plowed and converted to agriculture and then replanted as hay or pastureland. Planted grasslands within the Project Area appear to include a number of non-native, invasive herbaceous species including those listed as noxious, as described below.

NDCC Chapter 4.1–47 identifies 13 noxious weed plant species:

- Absinth wormwood (*Artemisia absinthium*)
- Canada thistle (*Cirsium arvense*)

- Dalmatian toadflax (*Linaria genistifolia* spp. *Dalmatica*)
- Diffuse knapweed (*Centaurea diffusa*)
- Houndstongue (*Cynoglossum officinale*)
- Leafy spurge (*Euphorbia esula*)
- Musk thistle (*Carduus nutans*)
- Palmer amaranth (*Amaranthus palmeri*)
- Purple loosestrife (*Lythrum salicaria*, *Lythrum virgatum*, and all cultivars)
- Russian knapweed (*Centaurea repens*)
- Saltcedar (*Tamarix* spp.)
- Spotted knapweed (*Centaurea maculosa*)
- Yellow toadflax (*Linaria vulgaris*)

Counties are also able to list additional noxious weeds for control within their jurisdiction. Logan County has designated black henbane (*Hyoscyamus niger*) as a noxious weed. McIntosh County has no additional designations.

6.14.2. Vegetation Resources Impacts and Avoidance/Minimization Measures

Badger Wind has designed the Project to minimize impacts to natural vegetation communities to the extent practicable. Almost all turbines are sited in cultivated croplands, and access roads are primarily sited in agricultural fields and mowed areas associated with roadsides or ditches.

Badger Wind has also minimized disruptions to natural vegetation communities by coordinating the locations of roads with landowners and utilizing existing roads, driveways, edge of field lines, or other previously disturbed areas for proposed facility access road locations to the extent practicable. Linear facilities (i.e., crane paths, access roads, and collection lines) have been co-located when practicable.

Vegetation will be removed from areas of permanent infrastructure footprints for the life of the Project. These areas include turbine pads, access roads, the project substation, the O&M facility, the ADLS tower, and permanent MET towers. With less than one percent of the total Project Area permanently converted for wind turbines or other project infrastructure, the Project will permanently remove approximately 92.3 acres of vegetation for the life of the Project, the majority of which is cropland (65.3 acres) (**Table 6-2**).

Temporary vegetation impacts will occur within construction easements or workspace during the construction of access roads, crane walks, turning radii, equipment laydown areas, turbine pads, collection line installation, the O&M facility, the ADLS tower, permanent MET towers, and

existing road intersection improvements. Construction of the Project will temporarily impact 1,362.5 acres of vegetation (see **Table 6-2**). Following construction, the temporarily disturbed areas outside of cropland will be re-vegetated with a seed mixture consistent with the surrounding vegetation and free of noxious weeds, in coordination with the NRCS and landowners. Once re-vegetated, these areas will be available for their present use. Construction workspace impact calculations are conservative, and actual impacts are anticipated to be less.

Because ground will be disturbed by equipment deliveries from different geographic areas, introduction of noxious weeds may occur. Badger Wind has developed a Reclamation and Noxious Weed Management Plan (**Appendix I**) that identifies and establishes the procedures to prevent the introduction and spread of noxious weeds during construction and ongoing operations. As detailed in the Badger Wind Reclamation and Noxious Weed Management Plan (**Appendix I**), appropriate BMPs will be employed during project construction to avoid or limit temporary impacts to vegetation. Temporary disturbance areas will be reclaimed and reseeded according to NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission. Badger Wind will work collaboratively with construction parties to prevent and/or minimize the introduction and spread of noxious weeds during construction and operations.

6.15. Wildlife

Badger Wind has been conducting wildlife and wildlife habitat studies for the Project since 2019 to evaluate potential impacts to wildlife. Based on the results of these studies, and in coordination with NDGF and USFWS, the Project Area was refined to avoid and minimize potential impacts to wildlife. The wildlife surveys summarized in **Table 6-8** were conducted in coordination with NDGF and USFWS and are consistent with the voluntary USFWS Land-Based Wind Energy Guidelines (WEG) and Eagle Conservation Plan Guidance. The iterations of each survey listed in **Table 6-8** are discussed in detail in the BBCS (**Appendix H**) and are also summarized in the sections below.

Table 6-8: Summary of Wildlife Studies for the Badger Wind Project

Survey Type	Study Period	Reference
Avian Use Surveys	May 2019–April 2020	Atwell 2020a
Avian Use Surveys	May 2020–April 2021	Atwell 2021a
Bald Eagle and Raptor Nest Survey and Monitoring	May 2019	Atwell 2019
Bald Eagle and Raptor Nest Survey and Monitoring	April 2020	Atwell 2020b
Bat Acoustic Monitoring	May 2019–October 2019	Atwell 2020c
Bat Acoustic Monitoring	May 2020–October 2020	Atwell 2021b
Grassland Assessment	August–September 2020	Atwell 2020d
Grassland Assessment	November 2021	WEST 2021a
Northern Long-Eared Bat Habitat Assessment	January 2020	Atwell 2020e
Sharp-tailed Grouse Lek Monitoring	May 2019	Atwell 2019
Sharp-tailed Grouse Lek Monitoring	April–May 2020	Atwell 2020b

Survey Type	Study Period	Reference
Sharp-tailed Grouse Habitat Assessment	November 2021	WEST 2021b
Whooping Crane Desktop Assessment	September 2021	Atwell 2021c

As discussed further in **Section 9.0**, Badger Wind coordinated closely with the USFWS, NDGF, and North Dakota Parks and Recreation (NDPR) regarding wildlife and species habitat. Specifically, the USFWS provided information related to federally listed threatened and endangered species (discussed further in **Section 6.16**), eagles, birds of conservation concern, and other migratory birds. The NDGF provided information relating to species of conservation priority (SCP), particularly relating to conserving habitat for these species. This included concerns relating to potential impacts to native prairie (also referred to interchangeably by NDGF as unbroken grasslands), wetlands, sharp-tailed grouse, bats, bald and golden eagles, and whooping cranes within the Project Area. The NDPR performed a review of the North Dakota Natural Heritage biological conservation database. No resources were identified within the Project Area, and the NDPR deferred further comment on the Project’s potential to impact wildlife to the NDGF and USFWS.

6.15.1. Existing Conditions

The following sections describe wildlife species identified during desktop and field studies as occurring within the Study Area.

6.15.1.1. Avian Species

Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918 prohibits the taking, killing, possession, transportation, import, and export of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior (16 USC § 703). The word “take” is defined by regulation as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect” (50 Code of Federal Regulations [CFR] § 10.12). The USFWS maintains a list of all species protected by the MBTA at 50 CFR § 10.13. This list includes more than one thousand species of migratory birds, including eagles and other raptors, waterfowl, shorebirds, seabirds, wading birds, and passerines.

The 1988 amendment to the Fish and Wildlife Conservation Act mandates that the USFWS “identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation activities, are likely to become candidates for listing under the Endangered Species Act of 1973.” As a result of this mandate, the USFWS created the Birds of Conservation Concern list. The goal of the BCC list is to prevent or remove the need for additional Endangered Species Act (ESA) bird listings by implementing proactive management and conservation actions and coordinating consultations in accordance with Executive Order 13186. The Study Area and Project Area are located within Bird Conservation Region (BCR) 11 – Prairie Potholes, which includes 34 BCC species, eight of which do not breed within the BCR.

As discussed in **Sections 6.2** and **6.14**, the predominant land cover types within the Project Area are cropland (39.4 percent), mixed-grass prairie (29.2 percent), and planted grassland (14.7 percent). Mixed-grass prairie and planted grasslands support both migratory and resident bird species for resting, foraging, and breeding activities.

Badger Wind completed two years of baseline general avian use surveys (i.e., diurnal avian activity surveys) to evaluate potential impacts to MBTA-protected species. Ten-minute fixed-point surveys were conducted during the spring (March through May) and fall (August through November) seasons from May 2019 to April 2021 to quantify general avian use of the Study Area. These surveys determined avian species composition, diversity, richness, and concentration within the Study Area both seasonally and spatially, including for species of concern. Avian use studies were conducted in accordance with the USFWS Land-Based WEG (USFWS 2012), the Eagle Conservation Plan Guidance: Module 1—Land-based Wind Energy, Version 2 (USFWS 2013), and the Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests (i.e., “final Eagle Rule”) (USFWS 2016a).

The year one diurnal avian activity surveys recorded 29,404 individual bird observations from 62 species. Many of the most commonly observed species were generalists that are often observed in agricultural areas, including mourning doves (*Zenaida macroura*), rock pigeons (*Columba livia*), and American crows (*Corvus brachyrhynchos*). Passerines and waterfowl together accounted for over 95 percent of bird detections recorded during spring diurnal avian use surveys. Large groups of Lapland longspurs (*Calcarius lapponicus*) and snow geese (*Chen caerulescens*) in particular influenced this pattern. Passerines and waterbirds accounted for over 80 percent of bird detections during fall avian use surveys, driven by large groups of red-winged blackbirds (*Agelaius phoeniceus*) and Franklin’s gulls (*Leucophaeus pipixcan*). Sandhill cranes (*Grus canadensis*; in spring) and waterfowl (fall) were observed flying at high altitudes well above the 200-meter-high sample plot and the rotor-swept zone (RSZ).

The year two diurnal avian activity surveys recorded 28,027 individual bird observations from 97 species. Many of the bird species that were commonly observed in the Project Area are habitat generalists that are regularly observed in agricultural areas, including several species of blackbirds and Lapland longspurs. Large groups of birds were observed moving through the Project Area during migration. These included snow geese, Franklin’s gulls, and sandhill cranes. Small-bodied passerines (particularly Icterids and Lapland longspurs) and waterfowl (particularly snow geese) together composed the majority (93 percent) of avian detections.

In total, for the year one and year two surveys, one federally listed endangered bird species (whooping crane), two species (bald and golden eagle) protected under the Bald and Golden Eagle Protection Act (BGEPA), and 35 North Dakota SCP (including whooping crane, bald eagle, and golden eagle) were detected. As of the preparation of this Application, 13 SCP species are also listed by the USFWS as BCC species for BCR 11 and/or throughout its range in the continental United States and Alaska (USFWS 2021a). Of the 34 BCC listed for BCR 11, 13 species were observed in the Project Area. The BCCS and associated baseline studies list the North Dakota SCP that were identified during year one and year two avian use surveys. **Section 6.16** discusses North Dakota SCP in more detail.

Eagles and Raptors

Badger Wind conducted aerial and ground-based eagle and raptor nest surveys in 2019 and 2020 to document eagle and non-eagle raptor nest locations within and adjacent to the Project Area (Atwell 2020a; Atwell 2021a). Raptor nest surveys were completed for the Project Area plus a ten-mile buffer. Badger Wind also recorded eagle and raptor use during the two years of eagle use and avian use surveys. These surveys and associated results are discussed further below.

Raptors

In total, 30 non-eagle raptor nests were identified within the Project Area and a two-mile buffer during eagle and raptor nest surveys; nine are within the Project Area, and 21 are outside of, but within two miles of, the Project Area. An additional three non-eagle raptor nests were incidentally found within the Project Area during microsite activities in 2021. Non-eagle raptor nests belonged to ferruginous hawks, great horned owls, red-tailed hawks, Swainson's hawks, and unknown raptor species. One red-tailed hawk nest that was located within two miles of the Project Area during 2019 raptor and eagle nest surveys was missing in 2020. Refer to the Badger Wind BBCS (**Appendix H**) for additional information regarding raptor nests in the Project Area.

Eagles

Under authority of the BGEPA (16 USC §§ 668–668d), bald eagles and golden eagles are afforded additional legal protection. The BGEPA prohibits the take, sale, purchase, barter, offer of sale, purchase or barter, transport, export, or import, at any time or in any manner of any bald or golden eagle, alive or dead, or any part, nest, or egg thereof (16 USC § 668). The BGEPA also defines take to include “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb” (16 USC § 668c) and includes criminal and civil penalties for violating the statute. The term “disturb” is defined as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury to an eagle, or either a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior (50 CFR § 22.3).

No eagle nests are located within two miles of proposed wind turbine locations. The nearest eagle nests to wind turbines (one inactive nest and one active nest) are both approximately 2.02 miles from nearest turbines (turbines 19 and 39, respectively). One active bald eagle nest was found within the Project Area during both the 2019 and 2020 eagle and raptor nest surveys. No other active eagle nests were found within two miles of the Project Area during 2019 and 2020 eagle and raptor nest surveys (Atwell 2020a; Atwell 2021a). However, on 10 March 2021, a new active bald eagle nest was located within the Project Area. The nest was found incidentally during eagle-use surveys. The 2019–2020 and 2021 nests are believed to belong to the same nesting territory, as the 2021 bald eagle active nest is approximately 1.98 miles (3.19 km) east of the 2019–2020 nest. As such, the 2019–2020 nest was classified as an alternate nest site (USFWS 2013; USFWS 2016b), since recent guidance issued by the USFWS notes that nesting bald eagles are not expected to roam beyond two miles from nest sites (USFWS 2020b). The 2019–2020 nest was checked repeatedly after the discovery of the nest on 10 March 2021, and during the course of those checks, it could no longer be located. No bald eagles were observed at the old nest site during these subsequent checks.

No golden eagle nests were located within the Project Area or within ten miles of the Project Area during eagle and raptor nest surveys in 2019 and 2020.

Badger Wind completed two years of avian use and eagle use surveys. In total, 34 bald eagle detections and six golden eagle detections occurred during year one eagle use surveys (Atwell 2020a). Total eagle detections during year two surveys were similar to year one. In total, 35 bald eagle detections and six golden eagle detections occurred during year two surveys (Atwell 2021a).

In total, 13 raptor species were observed during avian use and eagle use surveys in year one. Raptor mean use within the Project Area was greater during the fall compared to the spring. Swainson's hawks, red-tailed hawks, and northern harriers collectively accounted for approximately 68 percent of raptor detections in the spring season and 82 percent of detections in the fall season (Atwell 2020a).

In total, 11 raptor species were observed during avian use and eagle use surveys in year two. Raptor mean use within the Project Area was greater during the fall survey period compared to the spring. Swainson's hawks, red-tailed hawks, and northern harriers collectively accounted for approximately 66 percent of raptor detections in the spring season and 65 percent of detections in the fall season (Atwell 2021a). Overall, red-tailed hawks and Swainson's hawks comprised the majority of raptor species observed within the RSZ. Furthermore, only two SCP Level I ferruginous hawks were observed during year two avian use and eagle use surveys, both of which were within the RSZ. Level II northern harriers and American kestrels, however, tended to fly below the RSZ (Atwell 2021a).

Sharp-tailed Grouse

Aerial and ground-based sharp-tailed grouse lek surveys were conducted in 2019 and 2020 (Atwell 2020a; Atwell 2021a). Two confirmed lek locations were observed within the current Project Area boundary. Four confirmed, and one possible, lek locations were observed within one mile of the Project Area boundary. Seven confirmed, and one possible, lek locations were observed beyond the current Project Area's one-mile buffer. Confirmed leks held four to 27 individuals (Atwell 2021a).

During year one avian use and eagle use surveys, 38 sharp-tailed grouse were detected, including 32 in the spring and six in the fall. During year two avian use and eagle use surveys, 18 sharp-tailed grouse were detected, including nine in the spring and nine in the fall.

Refer to **Section 6.16** for a detailed discussion of special status species, including sharp-tailed grouse.

6.15.1.2. Mammals

Habitat for mammals can be found throughout the Project Area in agricultural fields, grasslands, and wetlands/waterways. Common mammals that may occur within the Project Area include white-tailed deer (*Odocoileus virginiana*), pronghorn (*Antilocapra americana*), coyote (*Canis latrans*), red fox (*Vulpes fulva*), raccoon (*Procyon lotor*), badger (*Taxidea taxus*), striped skunk

(*Mephitis mephitis*), three-lined ground squirrel (*Spermophilus tridecemlineatus*), and western harvest mouse (*Reithrodontomys megalotis*). All these species can be found throughout North Dakota and are habitat generalists.

6.15.1.3. Bat Species

Eleven species of bats are known to occur in North Dakota, six of which may occur within the Project Area. This includes big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), little brown bat (*Myotis lucifugus*), northern long-eared bat (NLEB; *Myotis septentrionalis*), and silver-haired bat (*Lasionycteris noctivagans*) (NDGF 2016a; NDGF 2016b; BCI 2019). One of these species, NLEB, is federally listed as threatened (USFWS 2020c) and is also considered a Level I North Dakota SCP. Two of these bat species, big brown bat and little brown bat, are also considered Level I North Dakota SCP.

Although the ranges of northern long-eared, big brown, and little brown bats overlap the Project Area, the Project Area is dominated by cultivated cropland and herbaceous land cover with very little forested habitat and no known caves or other karst landforms. Forested bat habitat is limited to approximately 62.9 acres (wooded parcels and wooded shelterbelts or tree lines manually delineated using satellite imagery), primarily consisting of small woodlots and shelterbelts scattered throughout the Project Area.

To characterize bat activity in the Project Area, acoustic bat monitoring was performed within the Project Area from 23 May–16 October 2019 at one MET tower and at four ground-based locations representative of potential turbine locations. The raised MET tower location was paired with a ground-based location. Three of the four ground locations and the one MET tower location were within the current Project Area. Overall, bat activity within the Project Area was relatively low. Approximately 89 percent of bat passes were classified as low frequency (<30 kilohertz [kHz]; big brown bat, silver-haired bat, hoary bat), and 11 percent were classified as high frequency bat passes (>30 kHz; eastern red bat, *Myotis* species). No federally listed bat species were confirmed; however, bat passes identified as high frequency could belong to the *Myotis* species group, which includes the NLEB. Four *Myotis* calls (0.20 percent of all bat calls) identified as little brown bat (North Dakota Level 1 SCP) were recorded during the study (Atwell 2020c).

A second year of acoustic bat monitoring occurred within the Project Area from 14 April–15 October 2020 at two MET towers and at four ground-based locations representative of potential turbine locations. Raised MET tower locations were paired with ground-based locations. Three of the four ground locations and both MET tower locations were within the current Project Area boundary. Overall, bat activity within the Project Area was relatively low. Approximately 82 percent of bat passes were classified as low frequency (<30 kHz; big brown bat, silver-haired bat, hoary bat), and 18 percent were classified as high frequency bat passes (>30 kHz; eastern red bat, *Myotis* species). As with the first year results, no federally listed species were confirmed. Two unknown *Myotis* species calls (0.18 percent of all bat calls) were recorded during the study; however, a species determination could not be made as these calls contained characteristics of both NLEB and little brown bat. An additional three *Myotis* calls (0.26 percent

of bat calls) identified as little brown bat (North Dakota Level 1 SCP) were recorded during the study (Atwell 2020c).

Badger Wind also performed a bat habitat desktop assessment of the Study Area and determined that potential suitable habitat for NLEB is limited within the Project Area (Atwell 2020e). The bat habitat desktop assessment found that less than 0.1 percent (approximately 62.9 acres) of the Project Area supports woodlands and wooded shelter belts that may provide roosting and foraging habitat for NLEB. Available wooded areas within the Project Area are highly fragmented, and there is very limited connectivity of wooded shelter belts throughout the landscape. Wooded stands on site are all less than ten acres in size. Most riparian areas in the Project Area do not support adjacent woodlands.

Refer to **Section 6.16** for a discussion of special status species, including the NLEB, big brown bat, and little brown bat.

6.15.1.4. Reptiles and Amphibians

A variety of reptiles and amphibians may be present within the Project Area, such as the Great Plains toad (*Anaxyrus cognatus*), northern leopard frog (*Lithobates pipiens*), boreal chorus frog (*Pseudacris maculate*), tiger salamander (*Ambystoma mavortium/Ambystoma tigrinum*), painted turtle (*Chrysemys picta*), snapping turtle (*Chelydra serpentina*), and common and plains garter snakes (*Thamnophis sirtalis* and *Thamnophis radix*). Most of the species listed here live in habitats associated with wetlands, streams, ditches, or waterbodies. A few of the species (e.g., Great Plains toad, garter snakes) may be found in more open areas, such as grasslands, meadows, or woodland edges (Johnson 2015).

Snapping turtle is considered a North Dakota SCP Level 2 species. This species prefers muddy-bottomed permanent or semi-permanent bodies of warm water or slow-moving rivers and streams with high sediment loads. Snapping turtle has been designated as an SCP due to habitat loss (e.g., the loss of aquatic vegetation, stumps, logs, and other debris), as well as road mortality, unregulated harvesting, contaminants, and deliberate killing due to perceived danger (Dyke et al. 2015).

6.15.2. Wildlife Impacts and Avoidance/Minimization Measures

Field and desktop studies indicate that impacts to wildlife and wildlife habitat are expected to be minimal because grasslands, wooded areas, shrublands, and other areas identified as important to wildlife are relatively limited within the Project Area and will largely be avoided through project design. The following sections describe potential impacts and proposed avoidance and minimization measures for wildlife.

6.15.2.1. Avian Species

Migratory Birds

Migratory birds may be impacted direct or indirectly as a result of the construction and operation of wind energy facilities. Direct impacts may result from collision with operating turbines or from

the clearing and construction of the Project. Indirect impacts may occur through habitat avoidance (i.e., displacement) as a result of construction activity or placement of a new feature on the landscape (e.g., wind turbine).

During both years of pre-construction avian use and eagle use surveys, passerines, waterfowl, and waterbirds typically accounted for the greatest proportions of detections. These trends were typically driven by large groups of Lapland longspurs, red-winged blackbirds, snow geese, Franklin's gulls, and sandhill cranes.

Overall, the species composition, seasonal abundance, and spatial use patterns documented during avian surveys are considered typical for birds in this region. The majority of species observed are common and abundant within the region. The Project is not anticipated to result in population-level impacts to avian species, including species of concern.

Potential impacts to avian species habitats, such as wetlands, woodlands, and grasslands, are described in **Sections 6.13** and **6.14**.

Grassland Breeding Birds

Badger Wind has conducted in-depth coordination with NDGF regarding potential impacts to "unbroken" or "native" grasslands that may be used by grassland breeding bird populations. Based on this coordination, Badger Wind completed desktop and field verifications of grassland communities within the Project Area. Field verification of grassland habitat conditions was used to not only confirm areas of unbroken grasslands, but also to identify areas that may once have been unbroken but have been subsequently converted to agricultural production (WEST and Piorkowski 2021). These results have been used to evaluate and inform project infrastructure siting decisions to avoid and/or minimize potential impacts to unbroken grassland habitat (Atwell 2020d; WEST and Piorkowski 2021).

Badger Wind is voluntarily prioritizing avoidance and minimization of impacts to unbroken, or native, grasslands, as there are no local, state, or federal protections for these plant communities, nor are there prohibitions against development on such grasslands. As discussed in **Section 1.2.4**, Badger Wind has revised the size and location of the Project Area and has moved project infrastructure out of unbroken grassland in the northeast corner of the Project Area. Badger Wind has avoided large, intact grasslands and focused land leasing efforts on actively managed agricultural lands to the degree that only two turbine pads will have permanent impacts to field-verified unbroken grassland. The north edge of the pad of Turbine 17 will impact 0.02 acres of this grassland. The west edge of Turbine 60 will impact 0.06 acres of this grassland type.

To reduce habitat fragmentation, roads and laydown areas have been sited in previously disturbed or agricultural areas, outside of unbroken grasslands, wetlands, and waterbodies, to the extent practicable. Existing roads will also be used where feasible to further reduce impacts. Badger Wind will use approved native seed mixes (as appropriate and where final approval is granted by the landowner) to restore temporary impact areas associated with construction activities. Lastly, Badger Wind is coordinating with the USFWS and NDGF on voluntary offsets for potential grassland breeding bird displacement.

Eagles and Raptors

In total, 33 non-eagle raptor nests were recorded within two miles of the Project Area, 12 of which were found within the Project Area. This total includes nests located during surveys as well as those noted incidentally during field micrositeing efforts. Non-eagle raptor species observed nesting within the Project Area include ferruginous hawks, great horned owls, red-tailed hawks, and Swainson's hawks. Badger Wind has designed the layout to minimize tree clearing and potential impacts to these nests. Badger Wind has sited turbines at least 0.25 miles from identified active, occupied non-eagle raptor nests to the extent practicable. Further, by siting turbines in cultivated areas to the extent possible, Badger Wind has reduced the potential for raptors to collide with turbines; although collisions may occur, population-level impacts are not anticipated.

No golden eagle nests were identified within the Project Area or within ten miles of the Project Area during eagle and raptor nest surveys in 2019 and 2020. Cumulatively, 12 golden eagle detections were recorded over two years of surveys. Given this low observed use rate, golden eagle use of the Project Area is expected to be minimal. Golden eagles are not likely to nest within the Project Area as the primary breeding range has been delineated mainly in the western half of the state (Dyke et al. 2015; AKN 2019). Therefore, impacts to golden eagles are not expected to occur as a result of the Project.

Cumulatively, 69 bald eagle detections were recorded over two years of surveys. One active bald eagle nest is, and one alternate bald eagle nest was, located within the Project Area. Impacts are not expected to occur to bald eagle nests as turbines have been sited at least two miles from these two nest locations. If guy-wired MET towers are required, they will be marked with avian flight diverters to reduce the potential for collisions. In addition, wildlife carrion and livestock carcasses will be removed in order to minimize attracting prey species and scavenging opportunities. No prairie dog colonies exist in the project area; they are a known prey source. Post-construction monitoring, which will be conducted for at least one year following construction, will provide more clarity regarding any impacts to eagles. If a new eagle nest is identified within the Project Area, or a project-related eagle fatality is confirmed, Badger Wind will coordinate with the USFWS and may implement adaptive management. Badger Wind continues to coordinate with the USFWS regarding recommendations and measures to avoid and minimize potential impacts to eagles.

Sharp-tailed Grouse

It is not anticipated that sharp-tailed grouse will experience direct impacts from construction of the Project. While this species is relatively common within the Study Area, sharp-tailed grouse tend to remain below the RSZ of wind turbines. This species is more likely to experience indirect impacts via avoidance of suitable habitat or displacement of lekking and nesting areas due to the presence of project infrastructure (Coppes et al. 2020).

Badger Wind has minimized siting of turbines, roads, and other infrastructure in unbroken grasslands, thereby minimizing the potential for impacts on grassland-dependent species, such as sharp-tailed grouse. Badger Wind has avoided large, intact grasslands and focused land leasing efforts on actively managed agricultural lands. Badger Wind has also voluntarily sited turbines at

least 0.5 miles away from known, active sharp-tailed grouse leks; outside of potential nesting habitat; and within agricultural areas to the extent practical in coordination with NDGF and the USFWS. To reduce habitat fragmentation, roads and laydown areas have been sited in previously disturbed or agricultural areas, outside of unbroken grasslands to the extent practicable. Existing roads will also be used where feasible to further reduce impacts. Additional mitigation measures for sharp-tailed grouse are further addressed in the project BBCS (**Appendix H**).

Following construction, temporarily disturbed areas will be reclaimed according to NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission, as detailed in the Badger Wind Reclamation and Weed Management Plan (**Appendix I**).

Badger Wind has prepared a BBCS based on the results of surveys and agency recommendations, which outlines specific mitigation measures that Badger Wind has implemented during project layout and design, or plans to implement during construction and operation, to avoid and/or minimize potential impacts on avian species, including but not limited to the following:

- Turbines will be sited at least 0.25 miles from identified active, occupied non-eagle raptor nests, to the extent practical. If turbines cannot be sited away from a raptor nest, Badger Wind will consult with the USFWS and NDGF to determine appropriate mitigation measures, including potentially removing or relocating the nest outside the nesting season.
- Construction activities will be initiated prior to the raptor nesting season, to the extent practical. In cases where construction activities must occur in proximity to active nests, activities will be limited to the extent practical, and nests will be monitored during the nesting season by a qualified biologist.
- As appropriate, areas will be checked for nests prior to disturbance and/or surface disturbance.
- Badger Wind has voluntarily sited turbines at least 0.5 miles away from known active sharp-tailed grouse leks in coordination with NDGF and the USFWS. Additional mitigation measures for sharp-tailed grouse sites are further addressed in the BBCS (**Appendix H**).
- Collection lines will be buried to reduce potential bird strikes with electric lines.
- If guyed permanent MET towers will be used, they will be marked with avian flight diverters.
- Wind turbine and permanent MET tower lighting will comply with minimum FAA requirements and will utilize an ADLS (refer to **Section 4.1.1.5**). Lighting of ancillary structures will be minimized, and downward-facing and/or motion-sensing lights installed, as practicable, to minimize attracting birds and bats.

- Contractors and subcontractors will be required to attend wildlife awareness training.
- Good housekeeping measures will be implemented during the construction period and over the operational life of the Project (e.g., collection and disposal of trash, debris, and limiting unharvested crops, as feasible).
- Wildlife carrion/livestock carcasses will be removed in order to minimize attracting scavengers or prey species.
- Vehicles will be limited to roads or specific construction paths and will adhere to established on-site speed limits.
- A SWPPP will be developed and implemented to limit potential for erosion-related impacts to wildlife or sensitive habitats.
- Pesticide, herbicide, fertilizer, and other chemical treatments will be used in accordance with federal and state regulations and laws to minimize drift and other potential impacts on native habitat.
- Post-Construction Mortality Monitoring (PCMM) will be conducted for at least a one-year period. The PCMM program will include searches for bird and bat carcasses and will correct for potential searcher efficiency and carcass removal biases.
- An adaptive management program will be implemented in accordance with the Badger Wind BBCS (**Appendix H**).

Badger Wind continues to coordinate with the USFWS and NDGF regarding appropriate mitigation measures for potential avian impacts. Should additional avoidance and minimization measures be warranted based on operational impacts or a change in listing status for a species that may occur within the project site, Badger Wind will coordinate with NDGF and/or the USFWS, as described in the Adaptive Management section in the Badger Wind BBCS (**Appendix H**).

6.15.2.2. Mammals

Ground-clearing activities associated with the construction of turbines, the substation, O&M facilities, permanent access roads, and associated facilities have the potential to impact habitat for ground-dwelling wildlife. However, the mammal species that are likely to occur on site are habitat generalists and can readily relocate to adjacent unaffected areas with no population-level impacts. If project construction were to impact these species' habitat, these species could readily relocate to adjacent unaffected areas.

Turbines and access roads have been sited to avoid wooded stands and shelterbelts to the extent practicable. Tree clearing will be avoided to the extent practicable. Where unavoidable, tree removal will be mitigated in accordance with the Commission's tree and shrub mitigation specifications.

After construction, all temporary surface disturbance will be reclaimed according to NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission, as detailed in the Badger Wind Reclamation and Weed Management Plan (**Appendix I**).

6.15.2.3. Bat Species

Impacts to bats may occur through loss of habitat or as a result of direct impact due to collision. Badger Wind has coordinated with the USFWS and NDGF and has designed the Project to avoid and/or minimize potential impacts to bat species. Badger Wind is voluntarily adhering to guidance included in the WEG to minimize potential impacts to bats. Turbines and access roads have been sited to avoid wooded stands and shelterbelts to the extent practicable, and less than 0.03 acre of impacts to wooded areas may occur.

There is the potential for bats to collide with turbines. However, based on the 2019 and 2020 pre-construction bat acoustic study results, bat activity was relatively low, peaking during the late summer and early fall migration period. Based on data from similar nearby wind projects, the Project is anticipated to have low bat fatality rates.

Badger Wind has prepared a BBCS that will be implemented during construction and operation of the Project (**Appendix H**). The BBCS documents Badger Wind's compliance with relevant wildlife laws and regulations and has been developed in a manner that is consistent with the USFWS Land-Based WEG. The BBCS documents the measures to be implemented during siting, construction, and operations to avoid and minimize impacts to bats by the Project.

In addition, Badger Wind will implement the following measures to avoid and minimize potential impacts to bats:

- Unavoidable impacts to trees will be mitigated consistent with the Commission's tree and shrub mitigation specifications.
- As appropriate, wooded areas will be checked for potential bat roosts prior to disturbance. If NLEB is detected, tree removal will be conducted in accordance with the USFWS 4(d) rule (refer to **Section 6.16**)
- PCMM will be conducted for at least a one-year period. The PCMM program will include searches for bird and bat carcasses and will correct for potential searcher efficiency and carcass removal biases.
- An adaptive management program will be implemented in accordance with the Badger Wind BBCS (**Appendix H**).

Badger Wind continues to coordinate with the USFWS and NDGF regarding appropriate measures to address potential bat impacts. Should additional avoidance and minimization measures be warranted based on operational impacts or a change in listing status for a species that may occur within the Project Area, Badger Wind will coordinate with NDGF and/or the USFWS, as described in the Adaptive Management section in the Badger Wind BBCS (**Appendix H**).

Refer to **Section 6.16** for additional information regarding the federally listed NLEB as well as the little brown bat and big brown bat, which are listed as SCP. Refer to the Badger Wind BBCS (**Appendix H**) for further information about bats in relation to the Project.

6.15.2.4. Reptiles and Amphibians

Impacts to wetland habitats are described in **Section 6.13**. The Project Area generally lacks preferred snapping turtle habitat, which includes warm water in lakes or rivers with a muddy bottom and aquatic vegetation. Given the limited impacts to wetlands, watercourses, and waterbodies, impacts to snapping turtles as a result of project development is expected to be minimal.

6.16. Rare and Unique Natural Resources

The following sections describe existing conditions, potential impacts, and proposed avoidance/minimization for rare and unique natural resources in the Project Area.

6.16.1. Existing Conditions

6.16.1.1. Federally Listed Species

The ESA of 1973, 50 CFR Part 402, provides a framework for the conservation of threatened and endangered plants and animals and the habitats in which they are found. Under the ESA, an endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. A proposed species is one that is officially proposed in the Federal Register to be listed under Section 4 of the ESA. The USFWS has one year after a species is proposed for listing under the ESA to make a final determination on whether to list a species as threatened or endangered. A candidate species is a plant or animal for which the USFWS has sufficient information on its biological status and threats to propose it as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher-priority listing activities. While candidate species are not legally protected under the ESA, it is within the spirit of the ESA to consider said species as having significant value and being worth protecting. Finally, critical habitat includes specific areas that are occupied by a species at the time of listing or unoccupied areas that are considered essential to the conservation of a species. Critical habitat must contain physical or biological features essential to conservation of the species and may require special management considerations or protection.

The USFWS Information for Planning and Consultation (IPaC) system was reviewed for a list of threatened, endangered, and candidate species and Designated Critical Habitat that could occur within the Project Area and a one-mile buffer (USFWS 2020c). According to the USFWS IPaC system, no Designated Critical Habitat is present in the Study Area or Project Area. Four federally listed species have the potential to occur within the Project Area and a one-mile buffer:

- Whooping crane (*Grus americana*; endangered)

- NLEB (threatened)
- Piping plover (*Charadrius melodus*; threatened)
- Red knot (*Calidris canutus rufa*; threatened)

Whooping Crane

The whooping crane was first listed as endangered in the United States in 1967. The species was grandfathered into the ESA of 1973, and critical habitat was designated in 1978. A single self-sustaining population exists, the Aransas-Wood Buffalo population, which migrates during spring and fall through a 2,400-mile-long by 200-mile-wide corridor spanning Saskatchewan, eastern Montana, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma and Texas (Urbanek and Lewis 2015). Individuals of this whooping crane population are not known to breed or reside in North Dakota. In North Dakota, the whooping crane is not present year-round; they are only present during the twice-yearly migration between winter grounds and summer nesting sites (i.e., April to June and September to November) (Urbanek and Lewis 2015). In North Dakota, the migratory corridor extends approximately 220 miles wide from east to west; however, 75 percent of the sightings occur within an 80-mile-wide band centered within the larger corridor. Whooping cranes are known to utilize a variety of wetland habitats within an agricultural landscape during migration stopovers (USFWS 2009). However, no Designated Critical Habitat for the whooping crane is present in Logan or McIntosh Counties, North Dakota (USFWS 2016c; USFWS 2019a).

The Project Area lies at the edge of the portion of the whooping crane migration corridor in which 75 percent of whooping crane sightings have occurred (Pearse et al. 2018). Based on stopover data (USFWS unpublished data), the closest whooping crane observations to the Project Area occurred within five miles of the Project Area boundary. The last whooping crane observation documented by the USFWS occurred between 31 October and 6 November 2011, comprising four individuals noted loafing in a pond and feeding in nearby fields approximately five miles southwest of the Project Area.

During an agency coordination meeting in January 2020, the USFWS and NDGF recommended performing a whooping crane stopover habitat assessment. NDGF noted the northwest corner of the Project Area site is considered core stopover habitat (January 2021 guidance letter). The USFWS also confirmed the Project Area is within the whooping crane migration corridor and that whooping cranes have been reported near or within the proposed Project Area (January 2021 guidance letter). Guidance letters and meeting memos are detailed in **Section 9**.

A whooping crane stopover habitat assessment was conducted for the Project in September 2021 using data sources recommended by the USFWS and NDGF. The assessment determined that there is potential suitable stopover habitat for whooping cranes within the Project Area; however, this habitat is of relatively lower quality and quantity compared to reference areas within the regional landscape (Atwell 2021c).

During on-site avian use and eagle use surveys, three adult whooping cranes were observed within the Project Area on 15 April 2020. The whooping cranes were observed foraging in agricultural areas (i.e., corn fields) throughout the day, approximately four miles northwest of

Wishek, North Dakota. The roosting location was confirmed to be within the west-central portion of the Project Area at the confluence of two seasonally saturated wetlands. Poor harvesting conditions in 2019 lead to the presence of unharvested corn in fields in the spring of 2020. It is possible that the whooping cranes were dispersing farther from the migration corridor's centerline than expected due to these conditions.

Northern Long-eared Bat

The NLEB was listed by the USFWS as threatened under the ESA on 4 May 2015, primarily because of the threat posed by white nose syndrome (WNS) (USFWS 2015a,b); the USFWS published a final 4(d) rule for the species on 14 January 2016 (USFWS 2016d). The USFWS determined that designating critical habitat for the species was not prudent (USFWS 2016e). The USFWS's final 4(d) rule for NLEB limits prohibitions for the incidental take of the species to those that would protect the bat in WNS-affected areas. All of North Dakota falls within the 4(d) rule zone (USFWS 2020d).

Per the USFWS final 4(d) rule for NLEB, within the WNS Zone incidental take within known hibernacula is prohibited, and incidental take due to tree removal is prohibited as follows:

- If it occurs within 0.25-miles (0.4 km) of a documented hibernaculum; or
- If it involves a documented maternity roost tree or other trees within 150 feet (47 meters) of the documented maternity roost tree from 1 June 1 through 31 July.

The NLEB is rare in North Dakota, and no known maternity roost trees or hibernacula are reported for NLEB in the state (USFWS 2019b). Publicly documented NLEB presence in North Dakota is west of the Missouri River within the Missouri River Valley, the Badlands of North Dakota, and the Moreau Prairie. The Project Area is located outside of core range for NLEB. Confirmed NLEB presence, captured via acoustic recordings and/or mist netting, range from approximately 53 to 187 miles west and northwest of the Project Area (Nelson et al. 2015; Shank et al. 2015).

The annual life history of the NLEB includes an inactive hibernating period and an active period when the species forages, raises its young, and breeds. NLEB hibernation begins in October and November and ends in March and April (USFWS 2016e). In April, the species emerges from its hibernacula and migrates to summer roosting habitat. The pup season occurs between 1 June and 31 July (USFWS 2016e). Suitable summer habitat for NLEB includes forested and wooded habitats, which may be interspersed with non-forested habitats (i.e., emergent wetlands, shelter belts adjacent to agricultural fields, and pastures). According to the USFWS, although the Project Area is not heavily forested, riparian corridors within the Project Area may serve as treed habitat for roosting and foraging in summer (refer to **Section 9**).

As discussed in **Section 6.15**, bat acoustic surveys were conducted within the Study Area in 2019 and 2020. Qualitative analysis of the acoustic data was inconclusive in that there were some *Myotis* calls that could not be attributed to species. Badger Wind also conducted a bat habitat desktop assessment of the Study Area and determined that potentially suitable habitat for NLEB

is limited within the Project Area (Atwell 2020e). As such, based on the habitat assessment and lack of conclusive NLEB calls detected, the potential for NLEB to occur in the Project Area is low.

Piping Plover

The piping plover was ESA listed in 1986. The Northern Great Plains population is listed as threatened. In North Dakota, this species is a summer resident and a seasonal migrant, arriving at their breeding and nesting grounds in early to mid-April and leaving by early September. No Designated Critical Habitat is present within the Project Area. In Logan County, the closest Designated Critical Habitat for the piping plover is approximately three miles northeast of the Project Area. In McIntosh County, the closest Designated Critical Habitat for this species is approximately 10.5 miles east of the Project Area (USFWS 2019a).

A January 2021 USFWS guidance letter indicates that piping plover habitats in Logan and McIntosh Counties comprise alkali lakes and wetlands, including sparsely vegetated shorelines, sandbars, islands, salt-encrusted mud flats, gravelly salt flats, and adjacent uplands 200 feet above the high water mark (**Section 9**). This type of habitat is extremely limited within the Project Area.

As discussed in **Section 6.15**, avian use surveys were performed within the Project Area in 2019 and 2020. Shorebirds within the Project Area were low in number and frequency; the highest concentration of detection was in the northeast portion of the Project Area where high elevation grassland/pothole habitats can be found. No piping plovers were detected during these surveys.

Rufa Red Knot

Rufa red knots were ESA listed as threatened in 2014. Rufa red knots migrate long distances annually between the Canadian Arctic and several wintering regions, including the southeastern United States (USFWS 2016f). A majority of rufa red knots follow migration routes along the east and west coasts of the United States, but small numbers of this species have been documented along an inland migration route across the Midwest during spring and fall migrations. These sightings are typically concentrated along the Great Lakes. Rufa red knots do not breed in North Dakota. They likely use habitats such as alkali lakes and wetlands, including sparsely vegetated shorelines, sandbars, islands, salt-encrusted mud flats, gravelly salt flats, and adjacent uplands 200 feet above the high-water mark when migrating in the state. No Designated Critical Habitat for rufa red knot is located in North Dakota (USFWS 2021b).

As discussed above in **Section 6.15**, bird habitat assessments and point-count surveys were performed within the Project Area in 2019 and 2020. No rufa red knots were detected during the surveys.

6.16.1.2. State Species of Concern

The NDPR maintains the North Dakota Natural Heritage Inventory database containing the known locations of rare animal and plant species and significant ecological communities within the state. In a November 2021 guidance letter, the NDPR indicated there are no known rare species or significant ecological communities documented within or immediately adjacent to the Project Area (refer to **Section 9** and **Appendix D**). The State of North Dakota does not have a state

threatened and endangered species list; instead, the NDGF maintains a list of SCP. Level I species are the highest level of conservation priority. Level II species are of a moderate level of conservation priority. Level III species are also of a moderate level of conservation priority, but are peripheral or nonbreeding in North Dakota (Dyke et al. 2015).

In a January 2021 guidance letter to Badger Wind, NDGF outlined species-specific considerations for sharp-tailed grouse, bats, whooping crane, and bald eagles (**Section 9**). Whooping cranes are discussed in detail in **Section 6.16.1.1**. Other SCP species are described below.

As noted in Badger's BBCS (**Appendix H**), Tier I and II analyses identified 21 SCP bird species (including the whooping crane and bald eagle) with the potential to occur within the Study Area. As noted in **Section 6.15.1**, each of these species was recorded within or adjacent to the current Project Area during the course of avian use surveys. See **Section 6.15** for more details relating to the results of avian surveys.

Three SCP bat species have the potential to occur within the Project Area: NLEB, big brown bat (SCP 1), and little brown bat (SCP 1). The big brown bat and little brown bat were detected during 2019 and 2020 acoustic monitoring within the Project Area. Due to the similarity in call signatures between big brown bat and silver-haired bat (*Lasionycteris noctivagans*; non-SCP), these two species were grouped during acoustic analysis and accounted for 42.8 percent of bat calls during 2019 and 37.3 percent of bat calls during 2020. Peaks in activity during spring and fall are likely attributable to silver-haired bat activity, but summer activity is likely from big brown bats. Little brown bat calls accounted for less than 0.5 percent of all bat calls during acoustic monitoring during both years.

Snapping turtle is a widespread and fairly common North Dakota SCP. Although no surveys were conducted for this species, it is likely to be found in suitable wetland habitat within the Project Area.

6.16.2. Rare and Unique Natural Resource Impacts and Mitigation Measures

The following sections describe potential impacts and proposed mitigation for impacts to rare and unique natural resources.

6.16.2.1. Federally Listed Species

Potential project impacts and avoidance and minimization measures for federally listed species are discussed below. Avoidance and minimization measures and general conservation strategies for federally listed species follow those described in **Section 6.15** for all avian species. The BBCS (**Appendix H**) outlines specific avoidance and minimization measures that will be used to avoid impacts to bird and bat species, including federally listed species.

Whooping Crane

Because whooping cranes were documented within the Project Area, and the whooping crane habitat assessment indicates that stopover habitat is present in the Project Area, there is the potential for whooping cranes to use the Project Area during migration. However, although

potential stopover habitat for whooping cranes is present within the Project Area, this habitat is of relatively lower quality and quantity compared to nearby reference areas analyzed in the whooping crane habitat assessment. Additionally, no whooping cranes have been documented as fatalities at wind facilities (USFWS 2009; NGPC 2018: 201).

Project collection and communication lines will be buried, thereby avoiding the potential for whooping crane collisions with overhead lines. Crops left unharvested, which could attract whooping cranes to the Project Area, will be minimized to the extent practicable. Although the occurrence of whooping cranes in the Project Area is unlikely, if whooping cranes use sites within or near the Project during migration, Badger Wind will avoid impacts to whooping cranes by implementing the general conservation measures for birds presented in the Project's BBCS. Although expected to be unlikely, if a whooping crane is sighted within the Project Area during construction, construction will stop within one mile of the sighting until the whooping crane has left the area.

Northern Long-eared Bat

Acoustic survey results within the Study Area were inconclusive in that there were some *Myotis* calls that could not be attributed to species. However, the Project Area is located outside the core range for NLEB, and suitable habitat for the NLEB is limited in the Project Area. The species is forest dependent and requires trees for roosting and foraging in summer. The bat habitat desktop assessment found that less than 0.1 percent (approximately 62.9 acres) of the Project Area supports woodlands and wooded shelter belts that may provide roosting and foraging habitat for NLEB. Available wooded areas within the Project Area are highly fragmented, and there is very limited connectivity of wooded shelter belts throughout the landscape. Wooded stands on site are all less than ten acres in size. As such, the potential for NLEB to occur in the Project Area is low. Accordingly, it is not likely that NLEBs are roosting in the Project Area; therefore, they would not be harmed by construction or operation of the Project. Per the final 4(d) Rule for the NLEB (USFWS 2016e), the Project will not result in prohibited incidental take because Badger Wind will not be clearing known maternity roost trees or trees within 150 feet of known maternity roost trees between 1 June and 31 July and will not remove trees within 0.25 miles of a known hibernaculum at any time of the year.

Per the final 4(d) Rule for the NLEB (USFWS 2016e), the project will not result in prohibited incidental take because Badger Wind will not be clearing known maternity roost trees or trees within 150 feet of known maternity roost trees between 1 June 1 and 31 July and will not remove trees within 0.25 miles of a known hibernaculum at any time of the year. As appropriate, wooded areas will be checked for potential bat roosts prior to disturbance. If NLEB presence is detected, tree removal will be conducted in accordance with the USFWS 4(d) rule (refer to **Section 6.15.2.3**).

Piping Plover

No Designated Critical Habitat for the piping plover is present in the Project Area. A January 2021 USFWS guidance letter indicates that piping plover habitats in Logan and McIntosh Counties comprise alkali lakes and wetlands, including sparsely vegetated shorelines, sandbars, islands, salt-encrusted mud flats, gravelly salt flats, and adjacent uplands 200 feet above the high water

mark (**Section 9**). This type of habitat is extremely limited within the Project Area. Additionally, no individuals were observed during avian surveys in 2019 and 2020. Therefore, impacts to piping plover as a result of project construction and operation are not anticipated, and no mitigation measures are proposed.

Rufa Red Knot

There is some potential for the rufa red knot to migrate through the Project or to utilize wetlands and waterbodies for stopover habitat, but habitat for the rufa red knot appears to be limited within the Project Area. Additionally, no individuals were observed during avian surveys in 2019 and 2020. Therefore, impacts to rufa red knot as a result of project construction and operation are not anticipated. Accordingly, no mitigation measures are proposed.

6.16.2.2. State Species of Concern

No designated special status plant species habitat, or protected vegetation communities, occur within the Study Area or Project Area. Therefore, no impacts from construction or operations of the Project would occur to these resources.

Impacts to State SCP would be similar to those identified in **Section 6.15.2** for wildlife. Potential impacts to avian and bat species from the Project include turbine rotor strikes during operations, direct impacts to nests or individuals during construction of the Project, and the removal, degradation, and fragmentation of habitat.

Badger Wind used field survey results to inform project design to voluntarily avoid potential SCP habitat. Specifically, Badger Wind minimized siting of project infrastructure within unbroken grassland, thereby minimizing disturbance to potential SCP habitat. Badger Wind has also voluntarily sited turbines at least 0.5 miles away from known, active sharp-tailed grouse leks in coordination with NDGF and the USFWS. To reduce habitat fragmentation, roads and laydown areas have been sited in previously disturbed or agricultural areas, outside of unbroken grasslands, wetlands, and waterbodies, to the extent practicable.

Wind turbines and other infrastructure have been sited to avoid wetlands to the maximum extent practicable. Given the limited extent of impacts to wetlands, watercourses, and waterbodies, impacts to snapping turtles as a result of project development is expected to be minimal. Impacts to SCP will be limited by avoiding and minimizing impacts to surface water features on site.

To reduce the potential for strikes with electric lines, all collection and communication lines will be buried. Impacts to bats and birds as a result of the Project would be minimized by avoiding and/or mitigating impacts to trees, consistent with the Commission's tree and shrub mitigation specifications.

Avoidance and minimization measures and general conservation strategies for SCP species follow those described in **Section 6.15** for all wildlife species. The BBCS (**Appendix H**) outlines specific avoidance and minimization measures that will be used to avoid impacts to both bird and bat species, including SCP.

6.17. Summary of Impacts and Avoidance/Minimization Measures

Table 6-9 provides a summary of potential Project impacts and avoidance and minimization measures.

Table 6-9: Summary of Impacts

Resource	Potential Impact	Proposed Avoidance, Minimization, and Mitigation	Section
Demographics	The Project will result in an increase in socioeconomic benefits for landowners, local governments, and communities by providing increased income to landowners receiving lease payments, which could raise the per capita income in Logan and McIntosh Counties. No long-term changes to demographics anticipated.	The Project will increase the local tax base, thereby creating benefits to local governments and communities.	6.1
Land Cover, Land Use, and Zoning	The Project would convert approximately 92 acres of land in the Project Area into a renewable, alternative energy source for the life of the Project. The Project would also result in approximately 1,363 acres of temporary impacts.	After construction, temporary disturbance areas will be reclaimed, fertilized, and reseeded according to NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission, as detailed in Appendix I . Lease payments will be paid to landowners for placement of Project facilities. The Project is compatible with existing land uses and has been designed to comply with local zoning requirements.	6.2
Public Services	Construction of the Project will temporarily increase traffic on haul roads. Traffic impacts associated with the operations phase after construction will be minimal. The Project has the potential to impact TV reception for residents relying on antennas. Impacts to local emergency services, railroads, water supplies, telephone, microwave, or radio communications are not anticipated.	Badger Wind will utilize North Dakota One Call to identify existing utilities prior to construction. Badger Wind will coordinate with applicable local and state road authorities to ensure that all applicable permits are obtained, delivery plans are communicated, and traffic management plans are implemented where necessary. Badger Wind will negotiate road use and maintenance agreements with Logan County, McIntosh County, and the townships, if needed. Following completion of construction, per the terms of the Road Use Agreements, affected roadways will be repaired or restored to a condition at least equal to the condition prior to construction of the Project. The Project has been sited to avoid microwave beam paths and communication systems. If residents that rely on antennas experience signal disruption, Badger Wind will coordinate with the residence owners to mitigate the disruption.	6.3

Resource	Potential Impact	Proposed Avoidance, Minimization, and Mitigation	Section
Human Health and Safety	No adverse impacts are anticipated.	Badger Wind has sited turbines and associated facilities in compliance with Commission and Logan County setback requirements. Badger Wind will comply with light-mitigating technology system requirements set forth in NDCC Section 49-22-16.4. Badger Wind will coordinate with emergency service providers to determine appropriate safety precautions/standards and develop an Emergency Response Plan.	6.4
Sound	A noise study was completed, and sound levels are modeled below 45 dBA within 100 feet of all inhabited residences and community buildings, with the exception nine receptors (six participating and three non-participating residents).	For the 9 receptors with exceedances, Badger Wind has obtained or is in the process of obtaining written waivers (Appendix J). In the event waivers are not obtained, Badger Wind will take steps to ensure compliance with the sound level requirement.	6.5
Visual	The Project will have visual and potential aesthetic impacts. A shadow flicker analysis was performed and indicated that the highest expected shadow flicker at a participating receptor is 38 hours per year. All other receptors, including all non-participating receptors, have expected shadow flicker less than 30 hours per year.	Compliance with applicable setbacks and minimum FAA lighting and marking requirements are anticipated to minimize visual impacts. Badger Wind has designed the Project to comply with the industry standard of 30 hours per year or less of shadow flicker at non-participating occupied residences, absent a waiver. One occupied residence is predicted to exceed 30 hours of shadow flicker per year. If this residence continues to exceed the 30 hour/year threshold when the final Project layout is modeled, Badger Wind will obtain a shadow flicker acknowledgment from the homeowner or will employ measures to ensure that the non-participating and participating occupied residence experiences no more than 30 hours per year of shadow flicker.	6.6
Cultural Resources	Ground-disturbing activities during construction have the potential to impact known or unknown cultural and historic architectural resources in or adjacent to the Project Area.	Class I, II, and III surveys have been completed for the majority of the Project, with a minimal number of unsurveyed areas to be surveyed in spring 2022. Project infrastructure has been sited to avoid sensitive cultural and historic architectural resources that have been identified and recommended for avoidance in the Project's Class I, II, and III cultural resources inventories. Additionally, Badger Wind has prepared an Unanticipated Discoveries Plan.	6.7

Resource	Potential Impact	Proposed Avoidance, Minimization, and Mitigation	Section
Recreational Resources	Impacts to recreational resources are not anticipated.	No mitigation is proposed.	6.8
Land-Based Economies	The Project will temporarily impact up to approximately 975.46 acres of agricultural land, and will impact up to approximately 69.49 acres of agricultural land for the life of the Project. The Project may impact approximately 0.03 acres of trees/shrubs.	Agricultural land temporarily impacted by construction will be restored to pre-construction conditions in accordance with NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission. Agricultural practices will be able to continue during Project construction and operations. After construction, temporarily disturbed non-agricultural lands will be revegetated using a seed mix approved by the NRCS in accordance with the Project reclamation plan. The Project has been designed to minimize tree removal to the extent possible, and the majority of Project facilities have been sited in areas lacking large contiguous woodlands. Any impacts on trees and woodlands from the placement of wind turbines and associated facilities for the Project would be minor in nature. If tree removal is necessary, Badger Wind will coordinate with landowners regarding tree removal and replacement and will follow the Commission's tree and shrub mitigation specifications. If necessary, Badger Wind may bore collection lines under tree lines and woodlots to avoid impacts.	6.9
Soil Resources	Surface disturbance caused by construction of the Project may cause the soil surface to become more prone to erosion and result in soil compaction and the spread of noxious weeds.	Impacts to soils within the Project Area will be localized to the areas where Project activities occur and minimized through the use of BMPs. BMPs may include erosion and sediment control measures, noxious weed control, segregation of topsoil, decompaction of subsurface soils before topsoil replacement, reseeding of temporarily disturbed areas, the use of construction equipment appropriately sized to the scope and scale of the Project, and designing access road grades to fit closely with the natural terrain, to the extent practicable.	6.10

Resource	Potential Impact	Proposed Avoidance, Minimization, and Mitigation	Section
Geologic and Groundwater Resources	Impacts to geologic and groundwater resources are not anticipated.	No mitigation is proposed.	6.11
Surface Water and Floodplain Resources	Construction of Project facilities could potentially impact surface water runoff within the Project Area. Ground-disturbing construction activities have the potential to cause sedimentation, but these impacts are expected to be minimal and would only occur during construction. The Project is not anticipated to permanently impact surface waters.	The Project and associated facilities have been sited to avoid or minimize impacts to surface waters and floodplain resources, to the extent practicable. Where collection lines intersect perennial watercourses, collection lines will be bored under watercourses to avoid impacts. If unavoidable impacts to USACE jurisdictional waters were to occur, these activities would be permitted under the Nationwide Permit Program. Badger Wind will also implement appropriate erosion and sediment control BMPs and obtain coverage under the NDPDES General Stormwater Permit.	6.12
Wetlands	One access road will cross a field-delineated drainage wetland that parallels an existing road resulting in a permanent impact of less than 0.01 acre to this wetland.	Badger Wind has sited this access road in the location of an existing farm road to minimize impacts to the affected wetland. A culvert will be installed where this access road crosses a drainage to facilitate continued wetland function and local hydrology. This impact will be self-certified under the Nationwide Permit in accordance with Section 404 of the CWA. Badger Wind plans to use boring to install underground collection when wetlands are present, thereby avoiding wetland impacts. In areas that will be field delineated in spring 2022, Badger Wind plans to re-route crane paths and access roads to avoid delineated wetlands, where feasible. Additionally, the construction workspace of crane paths, access roads, and turbine pads may be reduced in size or slightly shifted where practicable to avoid or minimize temporary impacts to wetlands. Matting will also be used in wetlands during construction to minimize temporary disturbances. If unavoidable impacts to USACE jurisdictional waters were to occur, these activities would be self-certified under the Nationwide Permit Program.	6.13

Resource	Potential Impact	Proposed Avoidance, Minimization, and Mitigation	Section
Vegetation	The Project will remove up to approximately 92.3 acres of vegetation (the majority of which is cropland) for the life of the Project. The Project will temporarily impact up to approximately 1,362.5 acres of vegetation.	Linear facilities (i.e., crane paths, access roads, and collection lines) have been collocated when practicable. Following construction, temporarily disturbed areas outside of cropland will be re-vegetated with a seed mixture consistent with the surrounding vegetation and free of noxious weeds, according to NRCS recommendations unless otherwise specified by the landowner and approved by the Commission. Badger Wind has developed a Reclamation and Noxious Weed Management Plan (Appendix I) that identifies and establishes the procedures to prevent the introduction and spread of noxious weeds during construction and ongoing operations and will work collaboratively with construction parties to prevent and/or minimize the introduction and spread of noxious weeds during construction and operations. Appropriate BMPs will be employed during project construction to avoid or limit temporary impacts to vegetation.	6.14
Wildlife: Avian Species	The Project may impact avian species through increasing the potential for bird strikes with the turbines and/or habitat impacts. \	The Project has been sited to avoid/minimize impacts to avian species by siting Project facilities in previously disturbed or agricultural areas, to the extent practicable. Project collection and communication lines will be buried, thereby avoiding the potential for collisions with overhead lines. Temporary disturbance areas will be reclaimed and reseeded according to NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission. If impacts to trees/shrubs occur, they will be mitigated per the Commission's tree and shrub mitigation specifications Badger Wind has also voluntarily sited turbines at least 0.5 miles away from known, active sharp-tailed grouse leks, outside of potential nesting habitat, and within agricultural areas to the extent practical in coordination with NDGF and the USFWS. Badger Wind is coordinating with the USFWS and NDGF on voluntary offsets for potential grassland breeding bird impacts. Badger Wind's s BBCS outlines proposed avoidance, minimization, and mitigation measures that will be implemented (Appendix H).	6.15

Resource	Potential Impact	Proposed Avoidance, Minimization, and Mitigation	Section
Wildlife: Mammals	The Project may impact habitat for ground-dwelling wildlife.	<p>Turbines and access roads have been sited to avoid wooded stands and shelterbelts to the extent practicable. Tree clearing will be avoided to the extent practicable. Where unavoidable, tree removal will be mitigated in accordance with the Commission's tree and shrub mitigation specifications.</p> <p>After construction impacts, all temporary surface disturbance will be reclaimed according to NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission, as detailed in the Badger Wind Reclamation and Weed Management Plan (Appendix I).</p>	6.15
Wildlife: Bat Species	Impacts to bats may occur through loss of habitat or as a result of direct impact due to collision. Less than 0.03 acre of impacts to wooded areas may occur.	<p>Badger Wind has coordinated with the USFWS and NDGF and has designed the Project to avoid and/or minimize potential impacts to bat species. Turbines and access roads have been sited to avoid wooded stands and shelterbelts to the extent practicable. Unavoidable impacts to trees will be mitigated consistent with the Commission's tree and shrub mitigation specifications. Badger Wind's s BBCS outlines proposed avoidance, minimization, and mitigation measures that will be implemented (Appendix H).</p>	6.15
Wildlife: Reptiles and Amphibians	Impacts to reptiles and amphibians as a result of Project development are expected to be minimal.	<p>Wind turbines and other infrastructure are sited to avoid wetlands to the maximum extent practicable to minimize potential impacts to snapping turtles. Impacts to reptiles and amphibians will be limited by avoiding and minimizing impacts to surface water features on site.</p>	6.15

Resource	Potential Impact	Proposed Avoidance, Minimization, and Mitigation	Section
Rare and Unique Natural Resources: Federally Listed Species	The potential for federally listed species to occur in the Project Area is low due to limited potential habitat; therefore, impacts to federally listed species are not anticipated.	Project collection and communication lines will be buried to avoid the potential for whooping crane collisions with overhead lines. Although the presence of whooping cranes within or near the Project Area is unlikely, Badger Wind will avoid potential impacts to whooping cranes by implementing the conservation measures for birds presented in the Project's BBCS, including stopping construction within one mile of a whooping crane sighting until the whooping crane has left the area. Tree clearing will be avoided to the extent practicable. Where unavoidable, tree removal will be mitigated consistent with the Commission's tree and shrub mitigation specifications. Removal of potential roost trees for NLEB will be avoided to the extent feasible and, in the event that removal is unavoidable, any such tree will be assessed prior to removal to confirm it is not a roost tree for bats, including NLEB. If NLEB presence is detected, tree removal will be conducted in accordance with the USFWS 4(d) rule. Badger Wind's s BBCS outlines proposed avoidance, minimization, and mitigation measures that will be implemented (Appendix H).	6.16

Resource	Potential Impact	Proposed Avoidance, Minimization, and Mitigation	Section
Rare and Unique Natural Resources: State Species of Concern	Impacts to state species of concern would be similar to those for wildlife.	<p>The Project has been sited to avoid and minimize impacts to SCP by minimizing siting of Project infrastructure within unbroken grassland. Turbines were voluntarily sited at least 0.5 miles away from known, active sharp-tailed grouse leks in coordination with NDGF and the USFWS. Roads and laydown areas have been sited in previously disturbed or agricultural areas, to the extent practicable, to reduce habitat fragmentation. Wind turbines and other infrastructure have been sited to avoid wetlands to the maximum extent practicable to minimize impacts to snapping turtles. Impacts to SCP will be further limited by avoiding and minimizing impacts to surface water features on site.</p> <p>All collection and communication lines will be buried to reduce the potential for strikes with electric lines. Impacts to bats and birds as a result of the Project will be minimized by avoiding and/or mitigating impacts to trees, consistent with the Commission's tree and shrub mitigation specifications.</p> <p>Avoidance and minimization measures and general conservation strategies for SCP species follow those described in Section 6.15 for all wildlife species. A BBCS (Appendix H) was developed, which outlines specific avoidance and minimization measures that will be used to avoid impacts to bird and bat species, including SCP.</p>	6.16

7. IDENTIFICATION OF POTENTIAL PERMITS/APPROVALS

Potential permits, clearances, and approvals that may be needed for the development and operation of the Project are listed in **Table 7-1**. Documentation of related agency correspondence is included in Appendix D.

Table 7-1: Potential Permits and Approvals

Administering Agency	Permit, Approval, or Consultation	Applicability for Project	Status
Federal			
U.S. Army Corps of Engineers	Federal Clean Water Act Section 404	Required if dredging or filling waters of the United States (WOTUS).	To be obtained prior to activity subject to permit, if needed.
U.S. Fish and Wildlife Service (USFWS)	Review for Threatened and Endangered Species	Consultation regarding potential impacts to species protected under the Endangered Species Act (ESA).	Coordination with the USFWS has been ongoing since October 2019.
Federal Aviation Administration (FAA)	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)	Construction or alteration of structures higher than 200 feet AGL, structures near airports, or siting within line of sight of radar of an air defense facility.	Filed October 2021; to be obtained prior to construction of turbines.
	Notice of Actual Construction or Alteration (Form 7460-2)	Supplemental notice to FAA in advance of or after commencing construction of turbines.	Notice to be provided in advance of or after commencing construction of turbines, as appropriate.
	Marking and Lighting Recommendations	Required for approval of light-mitigating technology.	To be obtained prior to marking/lighting.
Federal Communications Commission	Radio Station Authorization/License	Typically required for operation of ADLS communications tower.	If needed, will be obtained prior to activity subject to permit.
	Registration	Typically required for operation of ADLS communications tower.	If needed, will be obtained prior to activity subject to permit.
State of North Dakota			
North Dakota Public Service Commission	Certificate of Site Compatibility	Required for construction of an energy conversion facility with a nameplate capacity greater than 0.5 MW.	In progress; to be obtained prior to construction.
North Dakota Department of Environmental Quality	North Dakota Pollutant Discharge Elimination System (NDPDES) General Permit for Stormwater Discharge Related to Construction	Required for stormwater discharges from construction activities disturbing greater than one acre. Must also prepare a SWPPP.	To be obtained prior to activity subject to permit.

Administering Agency	Permit, Approval, or Consultation	Applicability for Project	Status
	(includes Stormwater Pollution Prevention Plan [SWPPP])		
	401 Water Quality Certification	Required in conjunction with Section 404 permit for filling jurisdictional WOTUS.	Incorporated into Section 404 Nationwide Permits.
North Dakota State Water Commission, Office of the State Engineer	Temporary Water Permit	Required for temporary uses of water, with the exception of when the volume of water to be impounded, withdrawn, or diverted is less than 12.5 acre-feet (4,073,137 gallons) and the water is used for domestic, fish, livestock, wildlife, or recreational purposes.	To be obtained prior to activity subject to permit, if needed.
	Conditional Water Permit	Required for water uses where the use period will exceed 12 months, with the exception of when the volume of water to be impounded, withdrawn, or diverted is less than 12.5 acre-feet and the water is used for domestic, fish, livestock, wildlife, or recreational purposes.	To be obtained prior to activity subject to permit, if needed.
	Drainage Permit	Required prior to drainage of a waterbody, pond, lake, slough, or sheetwater, or any series thereof, that has a watershed area of at least 80 acres.	To be obtained prior to activity subject to permit, if needed.
North Dakota Highway Patrol	Oversize/Overweight Permit	Required to transport oversized/overweight loads within state-managed roadways.	To be obtained prior to transport of oversized/ overweight loads, if needed.
North Dakota Department of Transportation	Utility Occupancy Permit(s)	Required to install electrical lines within state-owned roadway ROW.	To be obtained prior to construction work within state roadway ROW, if needed.

Administering Agency	Permit, Approval, or Consultation	Applicability for Project	Status
	Highway Access Permit(s)	Required to construct driveway access/approach to state-owned roadway ROW.	To be obtained prior to construction or alteration of access/approach, if needed.
	Temporary Modification Permits	Required for temporary modifications to state-owned ROW.	To be obtained prior to temporary modifications subject to permit, if needed.
North Dakota State Electrical Board	Wiring Certificate and Inspection Approval	Required for installation of electrical facilities.	To be obtained prior to activity subject to permit.
North Dakota State Historic Preservation Office (SHPO) / State Historical Society of North Dakota (SHSND)	Cultural and Historic Resources Review, Review of State and National Registers of Historic Sites, and Archaeological Survey	Consultation required in connection with other agency permitting requirements, such as the Commission.	Class I, II, and III surveys have been completed for the majority of the Project, with minor areas to be surveyed in spring 2022. Site forms have been submitted to the SHSND December 2021 for survey work completed to-date.
Local Approvals			
Logan County	Wind Energy Facility Permit (Conditional Use Permit)	Required for construction of a wind energy facility within Logan County.	In progress; to be obtained prior to construction.
	Building Permit(s)	Required to erect, construct, make structural changes, or move any structure.	If needed, to be obtained prior to construction of structures.
	Certificate(s) of Compliance	May be required in connection with building permits.	If needed, to be obtained in connection with building permit.
	Utility Permit(s)	Required to install electrical lines on/across county road ROW.	If needed, to be obtained prior to crossing and/or installation of electrical lines in county road ROW.
	Approach/Driveway Permit(s)	May be required for the installation of approaches/driveways abutting county road ROW.	If needed, to be obtained prior to installation of approaches.

Administering Agency	Permit, Approval, or Consultation	Applicability for Project	Status
	Oversize/Overweight Permit	Transportation of oversize/overweight loads.	If needed, to be obtained prior to transporting oversize/overweight loads.
McIntosh County	Oversize/Overweight Permit	Transportation of oversize/overweight loads.	If needed, to be obtained prior to transporting oversize/overweight loads.
Township(s)	Utility Permit(s)	Installation of facilities in/across township road ROW.	If needed, to be obtained prior to crossing and/or installation of facilities in township road ROW.
	Driveway/Approach Permit(s)	Installation of approaches abutting township road ROW.	If needed, to be obtained prior to installation of approaches.
	Oversize/Overweight Permit	May be required for transportation of oversize/overweight loads.	If needed, to be obtained prior to transporting oversize/overweight loads.
Water Resource District(s) (WRD)	Utility Permit(s)	May be required to cross WRD-owned ROW and infrastructure.	If needed, to be obtained prior to installation of electrical lines across WRD-owned ROW and infrastructure.
Local Public Health Unit (Central Valley Health District)	Septic system permit/approval	May be required for installation of septic system (O&M facility).	If needed, to be obtained prior to construction of the septic system.
Existing Infrastructure Owner(s)	Crossing License(s)/Permit(s)	May be required to cross existing easements (e.g., railroad ROW).	If needed, to be obtained prior to crossing existing infrastructure and easements

8. FACTORS CONSIDERED

NDCC Section 49-22-09 identifies factors that guide the Commission in assessing and designating a site for a proposed facility. These factors are discussed below.

8.1. Public Health, Welfare, Natural Resources, and the Environment

The preceding sections of this Application provide a review of the investigations related to the potential impacts to public health, welfare, natural resources, and the environment that could occur as a result of project development and operation. **Section 6.17** provides a summary of these potential impacts and the proposed mitigation measures that would be implemented to avoid or minimize these impacts.

8.2. Minimizing Adverse Environmental Effects

Badger Wind has, or will, utilize the most current available technologies to site, construct, and operate the Project in order to optimize utilization of wind resources while also minimizing or avoiding potential adverse environmental impacts. Mitigation, minimization, and/or avoidance measures to be implemented for each resource are described in each corresponding subsection within **Section 6.0**.

8.3. Potential for Beneficial Uses of Waste Energy

Wind energy generation does not produce waste energy. Therefore, the Project does not have the potential for beneficial use of waste energy.

8.4. Unavoidable Adverse Environmental Effects

Unavoidable adverse environmental impacts are described for each resource category in **Section 6.0**. Unavoidable long-term ground disturbance associated with the Project will include the conversion of land to a renewable energy generation resource and alteration of the visual landscape through the construction and lighting of turbines, as well as ancillary facilities, for the life of the Project. Areas temporarily impacted by project construction activities will be restored to their original conditions following construction, to the extent practicable and in coordination with landowners. Badger Wind selected the project site to minimize unavoidable environmental impacts and will implement appropriate mitigation measures throughout project development.

8.5. Alternatives to the Proposed Site

As discussed in **Section 1.2**, Badger Wind analyzed various siting options for the Project within a 197-square-mile Study Area. Badger Wind selected the proposed Project Area based on a variety of factors including suitable wind resource, landowner and agency coordination, site-specific studies, transmission and interconnection availability, and engineering considerations. The Project has been sited to avoid and minimize impacts to the environment and existing land uses. Badger Wind believes the proposed site represents the best location for the Project.

8.6. Irreversible and Irretrievable Commitments of Natural Resources

Renewable energy projects, including the Project, require relatively few irreversible and irretrievable commitments of natural resources. The primary irreversible and irretrievable commitments of natural resources for the Project are associated with project construction activities. Natural resources will be used in the manufacture and preparation of construction materials including steel, concrete, and aggregate. In addition, transportation of vehicles and equipment to and from the site during construction will require the use of hydrocarbon fuel. Although they would not be retrievable after use, supply of these materials is not sparse, and their use would not be expected to have a significant impact on resource availability. Further, the limited commitment of natural resources for the Project would be balanced against the anticipated benefits resulting from project development.

8.7. Direct and Indirect Economic Impacts

Direct economic impacts resulting from development of the Project will be primarily positive. The Project will result in conversion of land use during the life of the Project; however, the majority of the Project Area will remain available for agricultural uses, and participating landowners will be financially compensated for land occupied by wind turbines and associated infrastructure.

The Project may also indirectly benefit economies in the surrounding area due to the wages and salaries paid to locally hired workers and increased spending at local businesses. Additionally, long-term benefits to the tax bases of Logan and McIntosh Counties resulting from the Project will improve the local economy.

8.8. Existing Development Plans of the State, Local Government, and Private Entities at or in the Vicinity of the Site

The Project is not anticipated to conflict with the existing plans of state, local, or private entities within the Project Area. The Project will comply with applicable provisions of Logan County's Zoning Regulations (Logan County 2018). Additionally, Badger Wind is coordinating with the Wishek Municipal Airport and has adjusted project design to accommodate the airport's proposed expansion plans.

8.9. Effect of Site on Cultural Resources

Project infrastructure has been sited to avoid sensitive cultural and historic architectural resources that have been identified and recommended for avoidance in the Project's Class I, II, and III cultural resources inventories. Badger Wind continues to coordinate with the SHSND on archaeological and architectural resources. Additionally, Badger Wind will complete cultural resources surveys on any unsurveyed portions of the Project layout, will report the findings to the SHSND, and will obtain and provide the Commission with the SHSND's concurrence prior to constructing in those areas. If additional cultural resources are discovered, Badger Wind will work with SHSND to avoid or mitigate impacts. Badger Wind has also prepared an Unanticipated Discoveries Plan. This plan details the process for prompt communication and action in the event that previously unidentified cultural resources or human remains are encountered during project

construction. Refer to **Section 6.7** for additional details regarding the cultural resources survey efforts conducted for the Project and SHSND consultation.

8.10. Effect of Site on Biological Resources

Extensive efforts to avoid or minimize impacts to biological resources have been made in siting the Project, and efforts will continue during project construction and operation. The Project has been designed to minimize impacts to wildlife. Although the potential for bat and avian collisions with turbines exists, the Project is designed to minimize impacts to avian and bat species. Badger Wind has developed a BBCS in coordination with USFWS and NDGF that outlines specific mitigation measures that have been implemented during project siting and design, or that are planned to be implemented during construction and operation of the Project, to avoid and minimize potential impacts to wildlife (refer to **Appendix H**).

9. AGENCY COMMENTS

Badger Wind has coordinated with various agencies and used this input, as well as study findings, to inform appropriate siting of project infrastructure.

In October 2021, Badger Wind sent Project notification letters to 32 federal, state, and local agencies, including agencies and officers listed on NDAC Section 69-06-01-05. The project notification letters included a description of the Project and a map of the Project Area. The following sections summarize agency coordination efforts to date, organized by agency. A list of agencies consulted and copies of agency correspondence are provided in **Appendix D**.

9.1. U.S. Army Corps of Engineers, North Dakota Regulatory Office

Badger Wind contacted the Bismarck USACE Regulatory Office on 16 and 20 October 2020 and on 10 November 2021 to request guidance on application of the 2020 New Clean Water Act Rule.

On 1 November 2021 the USACE responded to the project notification letter stating the Project may need a Clean Water Act Section 404 permit. Badger Wind anticipates that impacts to USACE jurisdictional waters will be primarily temporary and permitted under the Nationwide Permit program.

9.2. U.S. Department of Commerce, National Telecommunications and Information Administration

Badger Wind coordinated with the NTIA regarding any potential project interference with federal telecommunications. In November 2021, the NTIA reviewed the turbine layout and current Project Area and stated that no agencies had issues with project placement.

9.3. U.S. Bureau of Land Management

The BLM responded to the project notification letter on 2 November 2021. The response stated that the BLM has no resource concerns for the Project and the Project does not appear to involve BLM land.

9.4. U.S. Department of Agriculture, Natural Resources Conservation Service

The USDA NRCS responded to the project notification letter on 20 October 2021. Because the Project does not integrate federal funding, the Farmland Protection Policy Act does not apply, and no further action is needed. Additionally, the NRCS recommended that impacts to wetlands be avoided.

9.5. Department of Defense

The Department of Defense (DoD) reviewed the Project through several venues throughout the development process. Initially, the DoD reviewed the process through the informal review provided through the DoD Clearinghouse. Badger Wind sent an initial project boundary to the DoD to review in 2018, asking for comment. DoD responded in 2019 that they had no concerns

with the Project. In 2019, Badger Wind filed FAA permits for an initial array of potential wind turbine sites. Through the FAA permit issuance process, DoD is afforded the opportunity to comment and ask for mitigation on any turbines that might impact military operations. Those permits were issued late in 2019, and no comments were received from or issues identified by DoD. Finally, the current turbine array was filed with the FAA in October 2021. Although the permits have not been fully issued by FAA because other stakeholders have not yet finished their reviews, the permit filings have cleared the DoD's review without any comments or requests for mitigation.

9.6. Wildlife Agencies (U.S. Fish and Wildlife Service, North Dakota Field Office, and North Dakota Game and Fish)

Badger Wind began coordinating with the USFWS and NDGF in early 2020. Meetings and iterative reviews of project information with the USFWS and NDGF helped to confirm appropriate resource surveys and protocols for the Project, as well as measures to avoid, minimize, and monitor potential impacts and incorporate adaptive management strategies. This coordination, in combination with Tier 1, 2, and 3 studies, were used to refine the Project Area and design the preliminary project layout. Meetings were held both in-person and virtually, in addition to email communication. Copies of correspondence with the USFWS and NDGF are provided in **Appendix D** and **Appendix H**. Significant meetings and communications are summarized below.

9.6.1. 28 January 2020 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting

Badger Wind met with the USFWS and NDGF to introduce the Project and its development team. Badger Wind presented the preliminary results of desktop and field studies that had been completed. This included information pertaining to land cover, USFWS grassland and wetland easement data, IPaC report results, nesting raptor surveys, sharp-tailed grouse lek surveys, avian use and eagle use surveys, desktop bat habitat assessments, and bat acoustic monitoring surveys. The agencies did not recommend conducting any other studies beyond the ones discussed at the meeting. Both NDGF and the USFWS noted concerns with siting turbines on or near USFWS wetland and grassland easements, as well as other easements under state or federal management. The agencies also suggested that Badger Wind quantify development effects on unbroken grassland and wetlands in order to offset the impacts.

9.6.2. 3 April 2020 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting

Badger Wind conducted additional consultation with the USFWS and NDGF to discuss aerial survey safety precautions given the COVID-19 pandemic and recent safety incidents that had occurred during nesting raptor surveys on other projects. The USFWS and NDGF accepted a modified hybrid aerial survey and ground-based survey approach to meet the goals and expectations for year two pre-construction raptor nest and lek surveys. The shortened aerial surveys would focus on areas within the Study Area that lacked roads and could not be easily accessed during ground-based surveys.

9.6.3. 22 April 2020 U.S. Fish and Wildlife Service Communication

Badger Wind contacted the USFWS on 22 April 2020 to report the incidental observation of three whooping cranes within the Study Area.

9.6.4. 30 October 2020 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting

Badger Wind met with the USFWS and NDGF to discuss avian and eagle use studies, wetland studies, grassland bird studies, and the native prairie assessment process. The NDGF clarified that they would be doing their own analysis of potential grassland breeding bird displacement and provided sources for data to assist in Badger Wind's analysis. They also outlined how different types of land disturbance should be integrated into the grassland breeding bird displacement analysis. The NDGF requested a completed analysis of unbroken grasslands for their review and concurrence.

9.6.5. 8 December 2020 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting

Badger Wind met with the USFWS and NDGF to provide an update regarding the Project including land acquisition, total project size and MISO results. Badger Wind also provided a summary of the grassland assessment completed and provided an overview of the project study planning considerations and non-grassland biology studies. The NDGF discussed the methodology they use to analyze potential grassland breeding bird displacement impacts and the differences between the two grassland datasets used in the analysis. Badger Wind and the agencies then discussed next steps for Project layout development and further refining of the grassland assessment.

9.6.6. 5 January 2021 North Dakota Game and Fish Consultation Letter

On 5 January 2021, NDGF provided a guidance letter on the habitat-focused approach to Badger Wind. Details of the letter included outlining the importance of native prairie (unbroken grassland) and wetland habitats. The NDGF suggested using the USFWS Habitat and Population Evaluation Team's Local Siting Decision Support Tool to estimate the number of duck pairs within the Project Area. The NDGF also noted species-specific considerations for sharp-tailed grouse, bats, whooping cranes and bald eagles, and pointed out resources to assist with planning and development of a potential voluntary offset package.

9.6.7. 15 January 2021 North Dakota Game and Fish Call

Badger Wind met with NDGF to follow up on outstanding questions from the 8 December 2020 meeting. NDGF confirmed their request for avoidance of native prairie and discussed the different grassland data sources to be used for a native prairie assessment. NDGF also confirmed that they would perform their own unbroken grassland/potential grassland breeding bird displacement impact analysis. Restoration and mitigation procedures were also discussed.

9.6.8. 29 January 2021 U.S. Fish and Wildlife Service Letter

On 29 January 2021, the USFWS provided a project review letter to Badger Wind. In the letter, the USFWS recommended siting turbines away from wildlife habitat (e.g., grasslands and wetlands) and instead siting project facilities in disturbed landscapes (i.e., cropland). The USFWS noted the presence of USFWS property interests in the area and recommended further coordination with respect to these interests. The letter also provided recommendations related to assessing, reducing, and/or mitigating potential impacts to wildlife, including grassland nesting birds, waterfowl, bats, whooping cranes, and eagles.

9.6.9. 9 August 2021 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting

Badger Wind met with the USFWS and NDGF to provide an update regarding the Project, including anticipated next steps and a proposed construction start date. A map of the project location, proposed turbine layout, and constraint factors was shown to the USFWS and NDGF. The grassland analysis methodology and inputs were outlined for and discussed with the agencies. Badger Wind showed turbines had been moved out of unbroken grassland. Badger Wind and the agencies discussed next steps in assessment of the Project's potential impacts to unbroken grassland and relevant turbine siting considerations. The whooping crane habitat analysis methodology was also discussed, and Badger Wind indicated that they have used all USFWS-recommended data sources and studies in that process. The USFWS and NDGF also asked if PLOTS easements and grassland and wetland conservation easements were considered in siting the turbines. Badger Wind confirmed that those areas had been taken into account.

9.6.10. 20 September 2021 North Dakota Game and Fish and U.S. Fish and Wildlife Service meeting

Badger Wind met with the USFWS and NDGF to discuss the ongoing grassland assessment, avian species impact analyses, and sharp-tailed grouse leks. The USFWS and NDGF requested a final project layout be provided with the grassland assessment, as well as a copy of the BBCS (with preconstruction surveys) and a voluntary offset proposal. Moving turbines out of unbroken grassland was also discussed.

9.6.11. 8 December 2021 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting

Badger Wind met with the USFWS and NDGF to provide project updates, including changes to the project layout and field survey results. Badger Wind presented a revised turbine layout that minimized the number of turbines in unbroken grasslands and avoided placing turbines in wetlands. Badger Wind also discussed the methodology and results of the year two sharp-tailed grouse lek survey, the methodology and results of a grassland habitat survey, and strategies for minimizing impacts to raptor nests within the Project Area. The remainder of the meeting

focused on calculating offsets for potential displacement of grassland and waterfowl breeding birds using the Shaffer and Loesch models.

9.6.12. 6 January 2022 U.S. Fish and Wildlife Service Meeting

Badger Wind met with the USFWS Kulm Wetland Management District to discuss details related to WPAs and grassland, waterfowl, and wetland easements. As an initial matter, the USFWS confirmed no fee-owned WPAs are located within the Project Area; only grassland and wetland easements are present in the Project Area. The USFWS confirmed that USFWS wetland easement protections are limited to the wetland basins. The USFWS also noted that boring underneath grassland easements, and wetland easement basins, without impacting the protected easement areas, was permissible without additional authorization. The USFWS requested that Badger Wind provide a notification letter prior to construction.

9.6.13. 10 February 2022 North Dakota Game and Fish and U.S. Fish and Wildlife Service Meeting

Badger Wind met with the USFWS and NDGF to provide project updates, including a change to the proposed layout. Badger Wind presented an updated overview of the Project and Ørsted's commitment to protecting biodiversity. Badger Wind also discussed the results of pre-construction eagle nest and use studies, provided a brief summary of avoidance and minimization measures that have been and that would be implemented for the Project, and confirmed materials that would be submitted to the USFWS and NDGF. The USFWS indicated it would provide documentation noting the USFWS's agreement with the proposed measures.

9.7. North Dakota Aeronautics Commission and Wishek Municipal Airport

The North Dakota Aeronautics Commission (Aeronautics Commission) replied to the project notification letter on 18 October 2021. The Aeronautics Commission noted the proximity of Wishek Municipal Airport to the Project and stated that there are no known private airstrips within the Project Area. While the Aeronautics Commission acknowledged that North Dakota does not regulate private airstrips, and none were identified in the Project Area, it asked that potential impacts to any private airstrips that may exist in or near the area be considered when siting turbines and towers. The Aeronautics Commission also requested that the locations of all MET towers be reported for inclusion in a map they maintain that is used as a safety resource by pilots.

Additionally, as discussed in Section 6.4, the Aeronautics Commission participated in discussions with Badger Wind regarding the Wishek Municipal Airport and Aeronautics Commission regarding the proposed project layout. The Wishek Municipal Airport and Aeronautics Commission identified concerns with five potential turbine locations. As a result of those discussions, Badger Wind modified the project layout, and the Wishek Municipal Airport and Aeronautics Commission indicated the modifications addressed their concerns.

9.8. North Dakota Department of Environmental Quality

The NDDEQ responded to the project notification letter on 27 October 2021. The NDDEQ stated that environmental impacts from the proposed construction of the Project are likely to be minor. The NDDEQ provided guidelines for minimizing degradation to waterways during construction, preventing spills, and the appropriate disposal of solid waste materials. Additionally, NDDEQ stated that they have no projects scheduled in the area and do not own any land within the Project Area. The NDDEQ stated that a permit for discharging stormwater runoff may be needed if the Project plans to disturb more than one acre. Badger Wind will obtain coverage under and construct the Project in compliance with the requirements of the NDPDES General Stormwater Permit.

9.9. North Dakota Department of Trust Lands

The North Dakota Department of Trust Lands responded to the project notification letter on 28 October 2021. The letter indicates that there are school trust surface and/or mineral interests within or near the proposed Project Area and that there are no active coal leases on school trust lands within the Project Area. The Department noted that easements must be obtained for any fee-owned trust lands included in the Project.

No fee-owned school trust lands are located within the Project Area, and Badger Wind has obtained leases with the surface owners of school trust mineral interest parcels.

9.10. North Dakota Department of Water Resources (formerly the State Water Commission)

The ND DWR responded to the project notification letter on 8 November 2021. The letter indicates that there are no FEMA regulatory floodplains within the Project Area, and therefore no permits are needed relating to the National Flood Insurance Program. The ND DWR Engineering and Permitting Section reviewed the Project and determined that changes or effects to ponds, sloughs, lakes, watercourses, or drainage patterns may require an ND DWR permit. ND DWR noted the Project does not require a temporary permit for water appropriation; however, if surface water or groundwater will be diverted for construction of the Project, a water permit will be required. The ND DWR stated that it maintains wells across the state for monitoring water levels and quality in glacial and bedrock aquifers and asked to be contacted if an observation well is encountered during project activities and must be removed. The project layout avoids impacts to observation wells; therefore, Badger Wind does not anticipate that ND DWR permits will be needed.

9.11. North Dakota Geological Survey

The North Dakota Geological Survey responded to the project notification letter on 22 October 2021, indicating that there are no geologic concerns for the Project at this time.

9.12. North Dakota Parks and Recreation

The NDPR responded to the project notification letter on 5 November 2021. NPDR noted that the Project does not appear to affect properties that NDPR owns, leases, or manages or any properties protected under Section 6(f) of the Land and Water Conservation Fund. Additionally, NDPR indicated that no known rare species or significant ecological communities are documented within or immediately adjacent to the Project Area. The NDPR deferred further comment on the Project's potential to impact wildlife to the NDGF and USFWS. A discussion of rare and unique resources in the vicinity of the Project can be found in Section 6.16.

9.13. North Dakota State Historic Preservation Office, State Historical Society of North Dakota

Badger Wind held an initial coordination meeting with the SHSND on 6 October 2020. At the meeting, Badger Wind proposed performing Class III archaeological studies and architectural history studies. The SHSND recommended that a Class II windshield survey be conducted to assess potential architectural sites in the Town of Wishek. The SHSND also stated at the meeting that they would like to review an unanticipated discovery plan.

A project update meeting with the SHSND was held on 21 September 2021 to confirm that Badger Wind should still conduct both the Class III archaeology study and the Class II architectural history study as discussed at the 2020 meeting. During the meeting, the SHSND confirmed that a Class III archaeological study and a Class II architectural history study were still appropriate for the Project and to proceed with both. The SHSND also requested that Badger Wind consider submitting the results of all surveys conducted, even for areas that may no longer be part of the Project.

Badger Wind has completed Class I literature reviews and a Class II architectural history survey for the Project. Additionally, Badger Wind has completed a Class III archaeological survey for all but a few small areas of the Project Area that will be impacted by project construction and will complete the remaining survey work in the spring of 2022. The Project has been designed to avoid impacts to cultural and architectural resources. Additionally, an Unanticipated Discoveries Plan has been prepared and will be submitted to the SHSND for review. Details about Badger Wind's archeological and architectural resource survey efforts are presented in **Section 6.7**.

9.14. Logan County

Badger Wind initiated coordination with Logan County in January 2019. An informal introduction with Logan County occurred on 12 May 2021. Badger Wind actively engaged with Logan County to understand the local permitting process throughout 2021. The engagement with Logan County included attending in person several County commissioners' meetings at which Badger Wind presented to update the commission members on the status and likely timeline for the Project and provide the commissioners the opportunity to ask questions and learn more about the Project. These meetings also provided Badger Wind the opportunity to ask questions and understand Logan County's local permitting process. Per those meetings and conversations, Badger Wind has engaged with Logan County to file applications for a local zoning permit in late

March 2022 and expects to hold public hearings in early April 2022, with permit issuance expected sometime in April of 2022. Additionally, Badger Wind plans to sign a road use agreement with the County to outline obligations during the construction of the Project. The road use agreement is expected to also be signed in April of 2022.

9.15. McIntosh County

Badger Wind initiated coordination with McIntosh County in January 2020 by beginning to discuss with the County any local permitting requirements for the Project and provide information related to the timeline and development process of the Project. Through this coordination, Badger Wind learned that McIntosh County has no zoning, so no permit will be filed or necessary with McIntosh County. However, Badger Wind is still pursuing a road use agreement with the County to outline obligations during the construction of the Project. On 12 May 2021, Badger Wind held in-person introductions with McIntosh County commissioners to provide an overview of the project. Discussions related to Road Use Agreements occurred in May and October 2021, and a draft Road Use Agreement was shared with the McIntosh County Commissioners in December 2021. Badger Wind received comments from the McIntosh County commissioners in February of 2022 and met in person to update the commissioners on the status of the Project and discuss the comments on the road use agreement. Badger Wind expects to provide an updated road use agreement to McIntosh County in late February 2022 and plans to execute the agreement as early as March of 2022. Badger Wind received a letter from McIntosh County on 1 December 2021 relating to zoning ordinances for the Project. The letter confirmed that McIntosh County has not enacted a zoning ordinance, and therefore the project does not need to obtain any zoning permits from McIntosh County. The letter references Badger Wind's commitment to enter into a road use agreement with McIntosh County and applicable townships (as necessary) regarding the use, improvement, and restoration of local roads in connection with project construction.

9.16. Community Outreach

Badger Wind has been active in the local communities of McIntosh and Logan Counties throughout the development process. Through the land leasing process, Badger Wind maintained an active presence in the community. Several landowner meetings were held in 2018, and multiple land agents were living in McIntosh County. Due to the COVID-19 restrictions, Badger Wind had to pause in-person meetings for the year of 2020. However, in 2021, Badger Wind hosted a project open house and a landowner dinner. Additionally in 2021, Badger Wind was a sponsor of the local sauerkraut festival and the Summer Fun festival, both in Wishek, North Dakota. Badger Wind is in active communication with the local communities to design additional sponsorship and donation programs that ensure broader access to the benefits of a wind farm, which will be put in place near the time of construction. Badger Wind is committed to being a good neighbor for years to come and keeping an open line of communication with local officials and stakeholders.

10. QUALIFICATIONS OF CONTRIBUTORS TO SITING STUDY

Table 10-1 presents the qualifications of contributors to the siting study.

Table 10-1: Qualifications of Contributors to Siting Study

Name and Project Role	Education and Professional Experience
Sarah Aftergood Director of Environmental Permitting Ørsted	Sarah Aftergood holds an MSc in International Marine Environment Consultancy from Newcastle University, United Kingdom, and a BSc Honors in Biology from Trent University, Canada. Sarah has more than ten years of experience working on the development and permitting of projects in renewable energy, power transmission and has developed bylaws and regulations concerning the protection of the environment from industrial activities both domestically and internationally. Specifically, in the United States, Sarah has experience with federal, state, and local permitting requirements in the Northeast, Midwest, and the West. Sarah's experience also includes community consultation and the management of environmental surveys for regulatory compliance.
Charles Smith Sr. Director, Development Ørsted	Charlie Smith holds a BA in Economics from Washington University in St. Louis. Charlie has more than eight years of experience working on the development, financing, and acquisition of renewable energy projects. Specifically, Charlie has been responsible for developing, financing, and acquiring over 3 GW of renewable energy projects that are now operational across Texas, Nebraska, South Dakota, and Illinois. Charlie joined Ørsted in October of 2018 when Ørsted entered the United States Onshore renewable energy market via the acquisition of Lincoln Clean Energy.
Francesca Martella Project Developer Ørsted	Francesca Martella holds a BS in Environmental Science and a BA in Literature from Duke University, Durham, North Carolina. Francesca joined Ørsted in June 2020 as a Project Developer and works on the development of onshore wind and solar generation projects, assisting from site identification through financial close and construction. Francesca's experience includes supporting regulatory compliance for local, state, and federal permitting.
Nicholas Gebauer Director, Development Ørsted	Nicholas Gebauer holds an MA from Clark University and a BS from Michigan State University. Having just joined Ørsted in January 2022, Nicholas has 11 years of prior experience in the renewable energy industry, working for a technical consultant before transitioning to project development starting in 2014. As a consultant or developer, Nicholas has been involved in the successful development, construction, or operation of several GW of wind and solar projects across the United States, with expertise in preliminary design and energy estimates, landowner and stakeholder relations, project due diligence, and performance optimization.
Francisco Salazar Project Manager Ørsted	Francisco Salazar holds a BS in Construction Management from the University of Nebraska Lincoln. Mr. Salazar has worked with Ørsted (f/k/a Lincoln Clean Energy) since May 2018 and comes from a strong commercial construction background before transitioning into renewable energy. Francisco has stepped into a variety of roles as the Pre-Construction Manager, Project Engineer, and Construction Project Manager with Ørsted.

Name and Project Role	Education and Professional Experience
Mollie Smith Attorney at Law Frederickson & Byron, P.A.	Mollie Smith assists clients with wind farm, transmission line, and pipeline permitting matters in North Dakota, South Dakota, and Minnesota. At the state level, Mollie represents clients in certificate of corridor compatibility, route permit, certificate of site compatibility, and rulemaking proceedings before the North Dakota Public Service Commission; energy facility permit proceedings before the South Dakota Public Utilities Commission; and certificate of need, route permit and site permit proceedings before the Minnesota Public Utilities Commission. At the local level, Mollie advises and assists clients with a variety of permitting-related matters, including obtaining conditional use/special exception permits, variances and subdivision approvals, and participating in zoning ordinance amendment processes. Mollie has a Bachelor of Arts in English from Northern State University, Aberdeen, SD; a Master of Arts in Literature from Colorado State University, Fort Collins, CO; and a Juris Doctor from the University of Minnesota Law School, Minneapolis, MN.
Bridget Duffus Attorney at Law Frederickson & Byron, P.A.	Bridget Duffus assists clients with wind farm, solar farm, transmission line, and pipeline permitting matters in North Dakota and Minnesota. At the state level, Bridget represents clients in certificate of corridor compatibility, route permit, and certificate of site compatibility proceedings before the North Dakota Public Service Commission; and certificate of need, route permit, and site permit proceedings before the Minnesota Public Utilities Commission. At the local level, Bridget advises and assists clients with a variety of permitting-related matters, including obtaining conditional use permits and variances. Bridget has a BA in Psychology from the University of St. Thomas, St. Paul, MN; and a JD from the University of St. Thomas School of Law, Minneapolis, MN.
Gabriel Constantin Senior Team Leader DNV	Since joining DNV in mid-2012, Gabriel Constantin has been involved in several renewable energy mandates in the United States, Canada, and abroad. He has focused his field of expertise around the environmental and permitting aspects of renewable energy projects as well as the relevant regulations and energy policies in different jurisdictions. More precisely, Gabriel has significantly contributed to the procurement of renewable energy approvals for multiple wind and solar projects across North America (more than 1,000 MW) by coordinating with stakeholders and agencies at all levels, participating in public open houses, managing subcontractors, and writing the mandatory environmental impact assessment reports. Moreover, he has significantly contributed to the environmental and social due diligence of various wind and solar projects in the United States, Canada, Mexico, and other international mandates. His experience also includes project management, environmental impact assessments, due diligence, permitting at various government levels and an array of consultation activities. Gabriel holds an M. Sc. in Geographical Sciences.

Name and Project Role	Education and Professional Experience
<p>Kimberly Peters, PhD Principal Biologist DNV</p>	<p>Kimberly Peters received her BA from Boston College, MSc from North Carolina State University, and PhD from Clemson University. She is an ecologist with over 25 years of experience leading research, conservation, and risk analysis programs on migratory shorebirds, wind energy collision risk, solar-wildlife interactions, grassland birds, and bird-aircraft strike-risk. Dr. Peters currently serves as a Senior Biologist and Team Lead for the Biological Services Team within DNV GL's Environmental & Permitting Services, where she provides technical and permitting support for the renewable energy sector in North America and globally. She is the lead author of the Canadian Wind Energy Association's Wind Energy and Bat Conservation Review, and her avian research has been published in various conservation and wildlife journals. Her primary interests are in migration ecology, coastal ecology, grassland ecology and management, full life-cycle analysis, and monitoring and estimation methodologies.</p>
<p>Kristian Rogers Project Biologist DNV</p>	<p>Kristian Rogers has been a Project Biologist with the Environmental and Permitting Services team at DNV since early 2021. Mr. Rogers holds an MPS in marine ecosystem management from the University of Miami in the United States and a BS in marine and freshwater biology from the University of Texas. Mr. Rogers has more than nine years of experience working in both the private and public sector on the development and permitting of projects related to environmental management, coastal infrastructure, and renewable energy projects both domestically and internationally. In the United States, Mr. Rogers has experience with interpreting federal, state, and local permitting requirements as they relate to the development of large-scale solar and wind energy projects.</p>
<p>Aren Nercessian Project Siting Engineer DNV</p>	<p>Mr. Nercessian has over 13 years of experience running acoustic models for renewable energy projects, has prepared over 50 reports on noise modeling of wind farms and has analyzed sound level measurements at more than 15 sites. He is very familiar with the noise regulations in many jurisdictions including Illinois, Michigan, Minnesota, Oregon, Alberta, Ontario, and Quebec. Additionally, Mr. Nercessian has also performed layout optimizations, shadow flicker assessments, visual simulations, and electromagnetic interference risk assessments on over 150 different projects under development. Mr. Nercessian has a bachelor's degree in mechanical engineering from McGill University in Montreal, Canada.</p>
<p>Justin Puggioni Siting and Acoustics Engineer DNV</p>	<p>Mr. Puggioni has over ten years of consulting experience working in acoustic engineering acquiring an in-depth understanding of the discipline. His project history covers the modeling, measurement, and analysis of acoustic impacts. He has conducted acoustic field measurements across the country and defended his work in public forums. His project portfolio includes offshore wind, onshore wind, IEC measurements, construction noise assessment, traffic noise assessments, horizontal directional drilling, and compressor stations. He has a BS degree in mechanical engineering from The University of Melbourne, Australia.</p>

Name and Project Role	Education and Professional Experience
<p>Frederic Gagnon Senior Scientist DNV</p>	<p>Mr. Gagnon holds a BSc in biology and a Master of Environment in Environmental Impact Assessment from Concordia University. Mr. Gagnon joined DNV GL in 2009 with 17 years of experience as a research scientist and technical writer. For the past 13 years, he has specialized in supporting renewable energy projects by addressing environmental and permitting aspects of development and environmental compliance, including by-law analysis, regulatory processes, stakeholder engagement, impact analysis, cumulative impacts, mitigation strategies, post-permit compliance, monitoring, and due diligence. Mr. Gagnon has developed specific expertise in the preparation of Environmental and Social Impact Assessments in conformance with the 2020 Equator Principles, IFC Performance Standards, and World Bank Environmental, Health and Safety guidelines. Mr. Gagnon has worked on hundreds of wind and solar projects in various jurisdictions within the United States, Canada, and internationally, and has been called upon to testify at public hearings in Quebec on health and safety related to wind energy development, sustainable development, and the environmental assessment process.</p>
<p>Chelsea Scheske GIS Analyst DNV</p>	<p>Chelsea Scheske holds a BEng in Bioresource Engineering from McGill University and a BA in International Development from the University of Regina. Chelsea has worked as a GIS Analyst for DNV's Renewable Advisory in Environmental and Permitting Services since January 2020, supporting renewable energy projects through in-depth GIS data analysis and assisting the biology, permitting, and engineering teams in many capacities. Chelsea has worked in the renewable energy and natural resources industries in various roles over the past decade, through roles as a researcher, a green technology specialist, and an editor of scientific papers. Currently Chelsea is a Candidate for the Engineering Profession in Quebec, working toward her Professional Engineering certification.</p>
<p>Sydney Notman GIS Analyst DNV</p>	<p>Sydney Notman holds an MS in Environmental Management from the University of Houston – Clear Lake and a BA in Geography with a specialization in GIS from Texas Tech University. Sydney has worked as a GIS Analyst with the Environmental and Permitting Services team at DNV since May 2021. In her current role, Sydney supports renewable energy projects through GIS data analysis and works closely with the biology, permitting, and engineering teams. Sydney has a background in the Oil & Gas industry, while working as a GIS Analyst for an environmental consulting company specializing in Phase 1 and Phase 2 ESAs and cultural impact and resource assessments.</p>

Name and Project Role	Education and Professional Experience
Amanda Klehr Project Biologist DNV	<p>Ms. Klehr has been a Project Biologist with the Environmental and Permitting Services team at DNV since 2015. She specializes in biological analysis for environmental assessments and operational compliance for terrestrial and offshore renewable energy projects in the United States and Canada. In her current role, she has worked closely with clients and colleagues for a variety of projects including technical due diligence reviews, environmental assessments and impact assessments, management plans, permit applications, site characterization and selection studies, and biological surveys. Prior to joining DNV, Ms. Klehr completed field work with Wildlife Conservation Society in Alaska focused on habitat disturbance and predation effects for nesting shorebirds in an oilfield and with Portland State University in Oregon related to population studies and behavior of avian species. Ms. Klehr is currently completing her Master of Science in Environmental Conservation at the University of Massachusetts Amherst and is researching avian use of operational photovoltaic solar facilities in NY and western MA.</p>
Cristen Mathews Project Biologist DNV	<p>Cristen Mathews holds an MSc in Conservation Medicine from the Tufts Cummings School of Veterinary Medicine and a BSc in Biopsychology from Tufts University. Cristen has worked as a Project Biologist with the Environmental and Permitting Services team at DNV since 2019, assisting with ensuring the environmental compliance of renewable energy projects by preparing and reviewing environmental permit applications, providing input for project site selection, and supporting technical due diligence reviews. She specializes in conducting Critical Issues Analyses for wind and solar projects and conducting biological analyses for environmental assessments and feasibility studies for onshore and offshore renewable energy developments in North America. Additionally, she also has experience in developing wildlife mitigation plans for the construction and operations phases of renewable energy projects.</p>
Lauren Fletcher Environmental Permitting Analyst DNV	<p>Ms. Fletcher holds an MS in Environmental Policy and Sustainable Management from The New School in New York. She has worked on wind, solar, and battery storage environmental permitting and due diligence projects. Ms. Fletcher is experienced in federal (National Environmental Policy Act, among others), state (the California Environmental Quality Act, among others), and local permitting in relation to renewable energies. Ms. Fletcher is also a deputy manager who has led bid preparation projects for offshore transmission lines and assisted with development of the construction and operations plan for an offshore wind farm. She is a highly detail-oriented professional who coordinates efficiently with all stakeholders to provide timely deliverables.</p>

Name and Project Role	Education and Professional Experience
<p>Christopher R. Rutledge Vice President, Environmental Services Atwell, LLC</p>	<p>Chris Rutledge holds an MS and Rangeland Ecosystem Science from Colorado State University and a BA in Environmental, Population, and Organismic Biology from the University of Colorado. With more than 25 years of professional experience, Chris has supported a variety of land development projects throughout the United States. His experience includes management of environmental and cultural resource surveys; threatened and endangered species surveys and permitting; wetland delineation, permitting, mitigation, and monitoring; development of weed management and restoration plans; local, state, and federal permitting; agency coordination; and stakeholder outreach.</p>
<p>Tanya Johnson Project Manager Atwell, LLC</p>	<p>Tanya Johnson holds a BA and MA Graduate Studies in Anthropology from Idaho State University. With more than 25 years of professional experience, Tanya has supported a variety of large-scale quick burn projects across the Western United States, Hawaii, Guam, and Japan. Her experience includes management of multi-tiered environmental projects in the renewable and traditional energy industries across natural and cultural resources issues with local, state, and federal permitting included.</p>
<p>Maureen O'Shea Stone Project Manager Atwell, LLC</p>	<p>Maureen O'Shea-Stone holds a BA and MA from the University of Colorado, Environmental, Population, and Organismic Biology. In her role at Atwell, Maureen directs and manages technical teams to support all aspects of federal, state, and local permitting, impact analyses, and environmental due diligence review for energy development projects, focusing on wind and solar development. Maureen has over 40 years of experience permitting and conducting environmental impact statement and environmental assessment processes for renewable and traditional energy projects throughout the American West and Midwest.</p>
<p>Michael Lester Environmental Consultant Atwell, LLC</p>	<p>Michael Lester holds a BS degree in Wildlife and Fisheries Biology from the University of Vermont and MS degree in Wildlife Conservation and Management from the University of Arizona. He has extensive experience working with state and federal agencies, non-profits, and private organizations on a variety of biological survey projects, with a particular focus on birds, as well as threatened and endangered species. In his role at Atwell, Michael coordinates pre-construction avian surveys and PCMM for renewable energy projects, including managing field staff, analyzing data, and writing annual reports. He also supports permitting for renewable energy projects in the Upper Midwest.</p>
<p>Caitlyn Cyrus Senior Project Coordinator Atwell, LLC</p>	<p>Caitlyn Cyrus holds a Master of Science in biology from College of William & Mary. She has extensive experience working on a diversity of energy projects, specializing in botany, rare, threatened, and endangered species surveys, and developing pollinator habitat for solar facilities. She coauthored the Pollinator-Smart Solar program for Virginia and is Vice President of the Flora of Virginia Project, which authored and maintains the dichotomous key used by botanists in the state. In her current role as a senior project coordinator at Atwell, she specializes in permitting renewable energy projects.</p>

Name and Project Role	Education and Professional Experience
Alan Plumeau Project Coordinator Atwell, LLC	Alan Plumeau holds a Master of Science in Interdisciplinary Biosciences from the University of Iowa. He has a breadth of experience in environmental consulting and permitting for a diversity of projects, with a primary focus on renewable energy developments. At his current role at Atwell, he serves as a project coordinator, specializing in permitting of wind and solar projects.
Chris Jessen GIS Analyst Atwell, LLC	Chris Jessen holds a Master of Science in geology from the University of Wyoming. He has over 23 years of experience working on projects in the mining, forestry, wind, solar, oil and gas, and agriculture industries across much of the Central and Western United States. He has focused on GIS aspects of renewable energy permitting, including constraints analysis, visual simulations, data mining/development/organization, county zoning, mineral rights, and parcel data analysis. He has also designed and developed multiple database applications that streamline data analysis and reporting.

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